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Original Communications.

*ON VEGETABLE DIET AND ON FATTY FOODS.**

By Professor Dujardin-Beaumetz, Paris, France.

GENTLEMEN,—If man claims a variety of aliments from the animal kingdom, equally important are those furnished by the vegetable kingdom. Considered as a whole, these vegetal foods contain as elements suitable for nutrition, 1, certain albuminoid substances,—gluten, vegetable albumen, casein, legumen, and fibrin; 2, starch; 3, dextrine and glucose; 4, fatty matters; 5, salts and water.

Foods thus constituted become complete aliments,—*i.e.*, aliments which contain all the primordial elements necessary for nutrition; only the vegetal proteids, the salts, and the fatty matters are in quantity insufficient to sustain life, at least in man, while, on the other hand, sufficing for the herbivora. The word *insufficient* is not even altogether applicable to man, for there are whole populations that are strictly vegetarian. In order, however, fully to meet the requirements of the economy, a great quantity of vegetable aliments must be ingested to supply the twenty grains of nitrogen which a man loses daily.

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. Printed from advance sheets.

The advantages of an exclusively vegetable diet have been latterly much overrated. We have heard it affirmed that by perseverance in such a diet man might successfully resist most diseases, and attain to a great age; this is the doctrine of vegetarians. While recognizing the great benefits which may be derived from a purely vegetable diet in certain affections of the stomach, I believe that man, by his anatomical and physiological constitution, is omnivorous, enjoying the fullest possession of his powers on a mixed diet; on this subject I shall hereafter have more to say.

The albuminoid principles of vegetables have been well studied by Ritthausen. They consist of vegetable albumen, casein, legumen, gelatin, gluten, and congluten. As for gluten, its composition is very complex, and Ritthausen affirms that it is made up of at least four albuminoid substances,—gluten-casein, insoluble in alcohol, and three substances soluble in alcohol,—gluten-fibrin, gliadine, and mucedine.

I give you here from Ritthausen the ultimate analysis of these vegetable albuminoid substances, as obtained from various cereals and legumes:

	Wheat.	Barley.	Indian corn.	Lupines.	Peas.	Beans.
Carbon.....	53.19	52.86	52.31	52.63	52.94	53.33
Hydrogen.....	7.18	7.23	7.73	7.46	7.13	7.19
Nitrogen.....	17.60	15.75	15.49	17.24	17.14	17.14
Sulphur.....	1.55	1.18	.....	0.76	1.04	1.04
Oxygen.....	20.55	22.98	.....	21.91	21.75	21.75

If you glance over the following table, which gives the proximate composition of our principal amylaceous foods, you cannot fail to observe that in general the amount of starch is in inverse proportion to that of the azotized matters:

In the vegetable alimentation starch and the amylaceous principles play an important part. You know that they are absorbed in the state of glucose, and that the transformation of starch into glucose is the result of two ferments,—the one, the product of mixed saliva, is the salivary diastase; the other, which belongs to pancreatic juice, is amylopsin.

This transformation of starch into sugar is not as simple as one might imagine at first sight. The supposed breaking up of the starch molecule into one molecule of dextrine and one of grape-sugar is not a representation of the reality, if we may trust the experiments of Musculus, of O'Sullivan, of Brown and Heron, and of William Roberts.

According to these experimenters, we must consider this reaction as much more complex, and as terminating by the formation of maltose and achro-dextrine, as the following formula shows:

$$\underset{\text{Soluble starch.}}{10(C_{12}H_{20}O_{10})} + \underset{\text{Water.}}{8H_2O} = \underset{\text{Maltose.}}{8(C_{12}H_{22}O_{11})} + \underset{\text{Achro-dextrine.}}{3(C_{12}H_{22}O_{11})}.$$

Ewald, of Berlin, has recently studied the influence which saliva exercises upon the saccharification of amylaceous matters in the stomach. He has shown that the transformation of starch into sugar is effected to a very trifling extent in the stomach, and that after the administration of a concentrated decoction of starch you may note the presence of fermentable dextrine and maltose, but that the metamorphosis of maltose into sugar takes place only in the intestine. If to the facts attested by Ewald we add that the pancreatic juice furnishes a ferment adapted to the digestion of amylaceous matters, we are warranted in the conclusion that starchy sub-

Ritthausen's Table of the Composition of Amylaceous Aliments.

Substances.	Azotized matters.	Starch.	Dextrine and Glucose.	Fats.	Cellulose.	Salts.	Water.	Authorities.
Wheat.....	20.68	62.49	8.36	2.32	3.02	2.86	.....	Payen.
Rye.....	9.00	57.50	10.00	2.00	3.00	1.90	14.60	Boussingault.
Oats.....	11.90	53.68	7.90	5.50	4.10	3.00	14.00	
Barley.....	12.96	66.43	10.00	2.76	4.73	2.10	.....	Payen.
Bread crumbs.....	6.67	53.55	3.79	0.70	.....	0.84	44.45	Violet.
Bread crust.....	13.00	62.58	3.88	1.18	.....	1.21	17.15	
Army bread.....	8.85	44.50	4.12	0.70	6.07	1.39	34.17	Poggiale.
Indian corn.....	12.80	58.40	1.50	7.00	1.50	1.10	17.70	Boussingault.
Rice.....	6.43	77.75	0.60	0.43	0.50	0.68	14.40	
Potatoes.....	2.05	20.00	1.09	0.11	1.04	1.26	74.00	Payen.
Horse bean (Faba equina).....	30.80	48.00		1.90	3.00	3.50	12.50	
Vetches.....	27.30	48.90		2.70	3.50	3.00	14.60	
French bean.....	25.50	55.10		2.80	2.90	3.20	9.90	
Lentils.....	25.20	56.00		2.60	2.40	2.30	11.50	
Peas.....	23.80	58.80		2.10	3.50	2.10	9.80	
English bean.....	24.40	61.50		1.50	3.00	3.60	16.00	

stances are exclusively digested in the intestine.

There is always an interest in knowing (and this especially with reference to the treatment of certain affections, and glycosuria in particular) the quantity of starch contained in cereals as vegetables. The following table from Nedats gives the percentage of starch in wheat, rye, potatoes, etc.:

	Per cent.
Rice	74.10
Indian corn	65.90
Wheat flour	63.00
Whole wheat	59.60
Rye flour	59.84
Millet	59.90
Buckwheat	50.00
Wheat bread	42.70
Oatmeal	39.10
Peas	37.00
Rye bread	36.25
Beans	36.00
Jerusalem artichokes	16.60
Potatoes	15.50

We will now study successively cereals, legumes, and fruits.

The cereals serve as the basis of the principal food, the universal food, of man,—bread. Without entering here into the details and complex chemical reactions of bread-making, I must call your attention to the nutritive value of bread. In this respect it is important to distinguish the crust from the crumb; the crust is much the more nutritious, as the following analysis by Barral shows:

Water.	Crust.	Crumb.
Water	17.15	44.45
Insoluble azotized matters (gluten, etc.)	7.30	5.92
Soluble azotized matters (albumen and the like)	5.70	0.75
Soluble non-azotized matters (dextrine, sugar)	4.88	3.79
Starch	62.58	43.55
Fatty matters	1.18	0.70
Mineral matters	1.21	0.84
	100.00	100.00

It is generally believed also that bread made from the coarser, inferior flours is more nutritious than bread made from superfine flour. This is a mistake, and Violet has shown us that the finer and whiter the flour the more nitrogen it contains. This is Violet's table:

	Percentage of nitrogen.		
	Second quality.	First quality.	Superfine.
First sample	0.92	1.18	1.39
Second sample	1.05	1.36	2.06
Third sample	0.99	1.02	1.25
Average	0.99	1.15	1.57

Nevertheless, in placing ourselves on a somewhat different stand-point, and in judging the nutritive value of bread not by the quantity of nitrogen which it contains, but by that of its saline principles, bread made from flour that is incompletely bolted possesses certain advantages.

You know, in fact, that the husks of grains are especially rich in phosphates; hence it has been recommended in certain cases, where it is desired to introduce phosphates into the economy, to give bran bread. When I come to speak of the dietetic treatment of diabetes, I shall show you by what artifices ordinary bread has been replaced by bran bread, or, better still, by gluten bread.

Rye, Indian corn, buckwheat, and even oats have been substituted for wheat in the fabrication of bread. Two of these deserve special mention. Corn bread is exceedingly nutritious. Cornmeal contains a larger proportion of fatty matters than the flour of any other cereal; hence it is that corn bread occupies a large place in the dietary of certain peoples, especially in regions where wheat cannot be raised. It has, however, a peculiar taste, which renders it repugnant to most persons, at least till they become accustomed to it. Oatmeal has been highly vaunted by the Scotch physicians, who claim that the fine physical development of that nation is due to the fact that they are reared on oatmeal. In a work undertaken by me, in conjunction with Ernest Hardy, I have shown the large proportion of nitrogen contained in oatmeal. The following analysis, published by ourselves, will make this plain:

Water	8.7
Fatty matters	7.5
Starch	64.0
Azotized matters, gluten	11.7
Mineral matters	1.5
Cellulose, and other matters not determined	6.6
	100.0

Hence it is that in the feeding of horses, oats, by reason of their richness in nitrogen, have been considered the force-giving aliment *par excellence*. Add to this that oats contain a particular excitant principle, which Sanson has isolated, and the effects of which he has studied. This excitant principle is found especially in black oats, and its effects on the horse last, on an average, for an hour after giving a quart of oats. The large percentage of iron in oats is also worthy of note.

This double quality of being a strengthen-

ing and excitant aliment renders oatmeal suitable for the dietary of children, and you will find in the thesis of my pupil Marie* interesting facts relative to this subject. I believe even that we might to-day complete our researches by studying on man, as Sanson has done on horses, the effects of the excitant principle, which he has isolated, and seeing if it may be utilized in therapeutics.†

Vegetables are divided into starchy and herbaceous. Starchy vegetables (legumes,—*i.e.*, beans, peas, lentils) contain a great quantity of legumine, and for this reason are very nutritious. Hence it is that beans have been called the *poor man's meat.* The following analysis is from Boussingault:

COMPOSITION OF SEEDS OF THE LEGUMINOSÆ.

	White beans.	Peas.	Lentils.	English beans.
Legumine	26.9	23.9	25.0	24.4
Starch and dextrine	48.8	59.6	55.7	51.5
Oily substance	3.0	2.0	2.5	1.5
Lignine and cellulose	2.8	3.6	2.1	3.0
Salts	3.5	2.0	2.2	3.6
Water	15.0	8.9	12.5	16 0
	100.0	100.0	100.0	100.0

The husk which covers these seeds is composed exclusively of cellulose, which renders them somewhat indigestible. So when you have to do with weak stomachs, or persons who masticate imperfectly, you should direct them to eat their beans or peas hulled, and boiled into a mash or soup.

Among these legumes I must call your attention to lentils, which deserve especial mention from the point of view of their nutritive value, being not only rich in azotized matters but also containing much iron.

Boussingault, who has given us a very instructive analysis of different aliments with respect to the iron which they contain, has assigned the first place to lentils; in fact, the proportion of this metal in lentils is double that which is found in beef, although surpassed by oats:

	Quantity of iron in 1000 parts.
Beef's blood	0.03750
Blood of swine	0.06340
Muscle of beef	0.00480
Muscle of veal	0.00270
Muscle of fish (Merlan)	0.00150
Fresh codfish	0.00420
Hens' eggs (without the shell)	0.00570
Snails	0.00360
Beef bones	0.01200
Sheep's foot	0.02090
Wheat bread	0.00480
White beans	0.00740
Oats	0.01310
Lentils	0.00830
Potatoes	0.00160
Cow's milk	0.00180
Carrots	0.00090
Indian corn	0.00360
Rice	0.00150
Apples	0.00200
Spinach	0.00450
Cabbage	0.00390
Red wine of Beaujolais	0.01090
Beer	0.00400
Seine water	0.00104

But do not forget that in order that lentil flour may possess all its properties it must be cooked, and it is in this form that you should prescribe it for your patients. It is quite probable that the sweet revalescière (a patent farinaceous preparation common in France), and which has been so much advertised, is composed in part of malted lentil flour.

By the side of these starchy vegetables, and at their head, should be placed potatoes, an aliment to-day quite as indispensable as bread. You have seen by a foregoing table how small the proportion of starch contained in potatoes, and in this respect this vegetable occupies a low place; hence the applicability of potatoes to the dietary of diabetes.

The herbaceous vegetables may be divided into three great groups,—vegetables rich in vegetal albumen and in nitrogen, such as cabbages, water-cresses, asparagus, mushrooms, truffles; then mucilaginous and saline vegetables, such as lettuce and chiccory; lastly, vegetables rich in acids, such as sorrel and tomatoes. Let us glance over these three groups.

The first comprises those vegetables which are the most nutritious but whose digestion is at the same time the most difficult. Leven maintains that cabbage is very hurtful to the stomach. I cannot agree with him, and regard cabbage as an excellent aliment, highly azotized, which is well digested when sufficiently cooked.

I will say a few words about mushrooms. Despite the large quantity of water which enters into their composition,—eighty-five to ninety per cent.,—they contain considerable nitrogen, and for this reason are nutritious. Carl Wœrner, of Upsal, who has recently studied the alimentary value of mushrooms,

* Marie, "A Study on the Employment of Oatmeal" (*Thèse de Paris*, 1873).

† Sanson, "Experimental Researches on the Excitant Action of Oats" (*Jour. d. Anat. et de Phys. de Ch.* Robin et Pouchet, t. xix., 1883, p. 113).

has shown that a kilogramme of beef has for equivalent :

	Kilogrammes.
In edible mushrooms (Agaricus esculentus).....	9.30
In oyster mushroom (Agaricus ostreatus)	10.60
In morilla (Morchella esculenta).....	15.20
In chanterelle mushrooms (Chanterellus cebarius)	41.60

The second class contains the mucilaginous and saline vegetables, and includes chiccory, lettuce, spinach, artichokes, celery, string-beans, asparagus, green peas, carrots, beets, and pumpkins. These are the aqueous vegetables, and the quantity of water which most of them contain is represented in the following formula :

	Per cent.
Cucumbers.....	96.2
Asparagus.....	92.2
Spinach.....	91.7
Cabbage.....	87.7
Turnips.....	87.0
Carrots.....	87.5
Turnip-cabbages.....	82.0
Artichokes.....	76.0
Jerusalem artichokes.....	76.0

Certain of these vegetables contain also inosite or sugar, as the beet and carrot ; the greater number are rich in salts, such as malates and oxalates of lime or potassium. This richness of vegetables in potassium is one of the most interesting points connected with their composition, and shows their utility in nutrition. Boussingault has given a good analysis of vegetables with respect to the quantity of potassium which enters into their composition. One kilogramme of the following vegetables contains the amount of potassium here given :

	Grammes.
Cabbage.....	2.6
Chiccory.....	1.7
Turnips.....	3.7
Carrots.....	2.5
Beets.....	6.8
Potatoes.....	3.2
Spinach.....	4.5

Hence Beunge has insisted on the necessity of introducing into the dietary of individuals who subsist largely on vegetables common salt, in order to maintain a constant equilibrium between the salts of potassium and sodium, an equilibrium which is essential to a healthy nutrition.

The last group is constituted by vegetables rich in acid, and particularly in oxalic acid. We have here sorrel and the tomato, which, when eaten too freely, may give rise to oxaluria. There has been much discussion respecting this physiological oxaluria, some pretending that it may be brought about independently of alimentation, others that it is always of alimentary origin. While believing that the latter view is the correct one, I shall reserve what I have to say on this subject till I come to speak of the diet of urinary gravel, and in particular of oxalic acid gravel. It remains to finish what pertains to vegetable foods by speaking of fruits.

Fruits complete the alimentation of man by the acids, the salts, and the sugar which they contain. Their general composition is very complex ; besides sugar, salts, and acids, gum, cellulose, and a small proportion of azotized matter enter into their composition. The following is Berard's analysis :

ANALYSIS OF RIPE FRUITS (BERARD, 1821).

	Apricots.	Peaches.	Pears.	Cherries.	Prunes.
Azotized matters.	0.17	0.93	0.21	0.57	0.28
Coloring matters.	0.10	.....	0.01	.....	0.08
	(Yellow.)		(Green.)		(Green.)
Cellulose.....	1.86	1.21	2.19	1.12	1.11
Gum.....	5.12	4.85	2.07	3.23	2.06
Sugar.....	16.48	11.61	11.52	18.12	24.81
Malic acid.....	1.80	1.10	0.08	2.01	0.56
Lime.....	Traces.	0.06	0.04	0.10	Traces.
Water.....	74.47	80.24	83.88	74.85	71.10
	100.00	100.00	100.00	100.00	100.00

The acids contained in fruits are very variable. Thus, peaches, apricots, apples, pears, and currants contain malic acid ; grapes, tartaric acid ; oranges and lemons, citric acid ; quinces, pectic acid ; the latter, by undergoing transformation into pectine, enables us to make jelly of this fruit.

Like vegetables, fruits introduce into the economy alkaline principles, such as lime and potassium ; they are then useful foods. By the sugar which they contain they serve also for nutrition, but when eaten too freely they become purgative.

I ought especially to call your attention to grapes, from which therapeutics has derived such great advantage in the treatment of certain affections,—a kind of treatment known under the name of *grape-cure*. Very much in vogue in certain parts of Switzerland and Germany, and now employed in France, this mode of treatment is particularly applicable to gastro-intestinal affections. It has proved of service in abdominal plethora, and paretic conditions of the alimentary canal from high living or overeating. If we may trust Carrière and Curchod, the grape-cure is also an efficacious means for combating diarrhœic fluxes and certain diathetic states, as gout.*

These are the principal rules to follow.

* Carrière, Grape-Cure in Switzerland in the Treatment of Chronic Diseases ; Curchod, Theoretical and Practical Treatise on Grape-Cure. Vevay, 1860.

You will direct the patient to eat before his meals a certain quantity of grapes, which he must himself gather from the vines, and which should be eaten while being gathered. I say a certain quantity, for it is impossible to say exactly how much each patient should eat. He ought, however, to eat to complete satiety, for the benefit is largely due to an excess being ingested. As for the kind of grapes to choose, the best is the white grape, with fine skin and delicate pulp. The skins must, of course, be rejected, and the seeds, if possible. As is the case with the whey-cure system, there are two important factors in the causation of the good results obtained from the grape-cure. The fruit itself by the saline elements which it introduces acts favorably on the surface of the digestive tube, and the sojourn (with active exercise) in the open air has an invigorating effect. It is, in fact, in the midst of the most beautiful scenery of Germany, Switzerland, Silesia, and Tyrol that the grape-cure is carried out. This completes what I have to say about vegetable foods, and I pass on to the consideration of fatty foods.

The fatty aliments consist of butter, fats, and oils. When I was on the subject of primordial alimentary principles, I reminded you of the importance of these fatty aliments in nutrition. Not only do they furnish to the economy the hydro-carbonaceous materials which it needs, but they oppose, in a certain measure, if we may trust the experiments of Debove and Flamant, the destruction of albuminoid elements, so that we may consider them as *sparing* aliments (*aliments d'èprargne*). If their nutritive value is great, their digestibility is feeble; hence it is that these fatty foods quite often prove to be the most indigestible, and when eaten in moderation they are a source of irritation and discomfort in the digestive tube, and, if taken in considerable quantity, they become real cathartics, constituting what has been described under the name of oily purgatives.

All these fatty substances are of vegetable or animal origin, constituting the fixed oils or fats. We may even add a third group,—the mineral fatty bodies, such as vaseline, a product of petroleum, and which, by a curious artificial process of refinement (as Riche has lately shown) has become an article of food. It has, however, been shown by experiments on animals that if vaseline be not toxic it does not possess any nutritive properties.

Among these fatty bodies there is one which plays a considerable rôle in therapeutics. I refer to cod-liver oil. From time immemorial among the maritime populations of the extreme north—in Iceland, in Greenland, in Norway—cod-liver oil has not only formed an important article of food, but has been applied to medical uses, special curative virtues having been attributed to it in rheumatism, neuralgia, and consumption. Percival and Darbey, at the end of the last century, called the attention of physicians to these remedial properties, but it was not till 1822, and consecutive to the work of Schenck, that the employment of this oil became general; and in France its speedy popularity was due to the labors of Bretonneau and Duclos.

To-day everybody is agreed in ascribing to cod-liver oil physiological properties clearly defined, and which consist especially in an increase of the weight of individuals to whom this oil is administered. We have here one of the results, the best demonstrated of late years, as you will see by the monograph of Rendu, of Lyons, which shows that in promoting increase of weight and fattening in the tuberculous, cod-liver oil is vastly superior to arsenic.*

Since Hoffer, of Lorme, found iodine in cod-liver oil, there has been a disposition to attribute to this metalloid, as well as to the bromine, sulphur, and phosphorus which the oil contains, the curative action which it possesses. I believe that this is a mistake, and I am persuaded that it is for the most part as fatty substances that these oils do good in the treatment of tuberculosis; and if I insist on this point, it is because the attempt has been made to substitute for cod-liver oil certain iodized oils, which are far from having the same effects.

The question has been often asked, What kinds of cod-liver oil are the best? Shall we give the preference to the pale over the brown oils? I do not think that there is now any doubt as to the answer which should be given to this question, and almost everybody is agreed that the pale oils, known as *virgin oils*, are better tolerated by the stomach than the brown oils, and are more palatable, while being of equal therapeutic value.

Moreover, the fabrication of these cod-liver oils has undergone great improvement, and today, with the exception of oleum morrhuæ of Berthé, which is still made in Paris, all the

* Joanny Rendu, Experimental and Comparative Study of Arsenic and Cod-Liver Oil in the Treatment of Pulmonary Phthisis. Lyons, 1878.

other oils are manufactured at the fishing stations in Sweden and Norway. Instead of making use of livers that have undergone partial decomposition, as was the custom formerly, only fresh livers are now used. These are thoroughly heated over a sea-bath and subjected to pressure. It is, then, the fresh virgin oil which you should always prescribe. The following analysis gives you the composition of these different oils :

	Cod-liver oil.				
	White.	Amber colored.	Pale yellow.	Brown.	Dark brown.
Oleine.....	988.700	988.675	988.695	987.449	988.957
Margarine...	8.060	8.066	8.089	9.264	8.323
Chlorine.....	1.122	1.122	1.116	1.018	1.005
Iodine.....	0.027	0.327	0.322	0.310	0.201
Bromine.....	0.043	0.043	0.030	0.031	0.016
Sulphur.....	3.201	0.200	0.196	0.156	0.142
Phosphorus..	0.203	0.204	0.200	0.196	0.076
Acids.....	0.000	0.439	0.897	0.924	0.838
Loss.....	1.344	0.924	0.449	0.102	0.437
	1000.000	1000.000	1000.000	1000.000	1000.000

There has been some dispute as to whether it would do to substitute for cod-liver oil oil obtained from other fishes, such as the skate and dog-fish. By referring to the comparative analysis of Delattre, you will see that the oils of the livers of the ray and the dog-fish are almost identical in composition with cod-liver oil :

	Cod-liver oil.	Ray-liver oil.	Dog-fish-liver oil.
Oleine.....	988.700	986.945	987.114
Margarine	8.060	11.017	10.121
Chlorine.....	1.222	1.125	1.018
Iodine.....	0.327	0.105	0.345
Bromine	0.043	0.039	0.034
Sulphur.....	0.201	0.165	0.160
Phosphorus	0.203	0.286	0.206
Loss	1.344	0.238	0.942
	1000.000	1000.000	1000.000

I do not propose here to enter into the detail of the administration of cod-liver oil. A multitude of processes have been devised, which belong rather to pharmacy than to dietetics. There are, however, two points pertaining to the latter to which I desire to call your attention.

First, I cannot too much urge the importance of giving cod-liver oil at meal-time, for when mixed with the whole mass of the food, and at the moment of the digestive process, these oils are better supported than when given on an empty stomach. Some have even gone so far as to recommend the incorporation of cod-liver oil with bread, but this combination is far from being palatable, and those who have used it have soon taken a disgust to both cod-liver oil and bread. The only association which seems to me a happy one is that which consists in the union of cod-liver oil with sardines, the latter oil being used instead of the oil in which sardines are ordinarily preserved.

You know also that the instrument-makers have devised spoons tapering towards the end, which enable you almost to pour the oil into the throats of your patients, and thus avoid the disagreeable taste which cod-liver oil leaves in the buccal cavity. Habit, moreover, has a good deal to do with the repugnance which persons have to taking cod-liver oil, and while the people of the north relish it, the inhabitants of Central Europe find it very disagreeable. But it is a fact that children generally imbibe the oil with willingness, and, when the habit of taking it is formed, with avidity.

I advise you to discard all those pharmaceutical emulsions which have been devised to mask the taste of cod-liver oil. There are two of these mixtures, nevertheless, which deserve to remain, as they associate with the oil principles which are of use in the treatment of scrofula and tuberculosis. I refer to the preparations of oleum morrhuæ with iodoform and eucalyptol. The first, highly recommended by Fonssagrives, has the following formula :

℞ Pale ol. morrhuæ, 100 grms. (ʒiiiss.);
Iodoform, 0.25 grm. (3½ grs.);
Essential oil of anise, gtt. x. M.

The preparation with eucalyptol is as follows :

℞ Pale cod-liver oil, 100 parts;
Eucalyptol, 1 part. M.

As for the dose of cod-liver oil and the quantity to be administered daily, this is very variable. Jaccoud, who is one of the most strenuous advocates of this remedial agent in the treatment of tuberculosis, has gone as far as 300 grms. (or about 10 ounces) per day. This is very large dosing, and few stomachs can bear anything like this quantity. Generally one is obliged to be satisfied with the moderate dose of a tablespoonful after each meal.

My regretted master, Behier, had an instinctive horror of cod-liver oil, and would never prescribe it ; as a substitute, he recommended butter. Butter is, in fact, an excellent aliment, but very inferior as a fatty principle to fish oils.

Butter is constituted, as you know, of those oil-corpuscles which are in suspension in milk.

It contains 83.35 per cent. of pure butter and 16.25 of buttermilk. The composition of butter is very complex. What especially characterizes it is a sweet oil formed of a mixture of oleine and butyrine. Butyrine, in contact with air, undergoes transformation into butyric acid, which gives to rancid butter its disagreeable taste and smell. Bromeis has completed the analysis of Chevreuil, and gives the following as the composition of good butter:

	Per cent.
Margarine	68
Butroleine	30
Butyrine, caproine, and caprine	2

Butter is an excellent fatty aliment, the usage of which you will do well to recommend to feeble and emaciated persons. It enters into several pharmaceutical preparations. It is made the basis of several ophthalmic salves, such as the pomade of Regent, the pomade of Benedict, the pomade of St. André, of Bordeaux. These preparations ought every one of them to be now abandoned, for the tendency of butter to become rancid makes it a bad excipient, and the unalterable mineral fats are far preferable.

Under the name of *bromo-iodized butter*, Trousseau proposed the following mixture, which he designed to replace cod-liver oil:

℞ Iodide of potassium, 0.05 grm.;
Bromide of potassium, 0.20 grm.;
Chloride of sodium, 2 grms.;
Fresh butter, 125 grms. M.
S.—To be spread on bread like butter.

I have, however, very little faith in any of these substitutes for cod-liver oil.

As intermediate between butter and milk should be mentioned cream, which has been vaunted in the treatment of certain consumptive affections and gastro-intestinal disorders. The following is Hasson's analysis of cream:

Butter	20 and sometimes	30 per cent.
Caseine	29 " "	11 " "
Serum	51 " "	59 " "
	100	100

Cream is, then, a mixture of butter, caseine, and serum. It is easily borne by weak stomachs, and doubtless sometimes renders service where other fats cannot be tolerated.

Such are the different points to which I desired to call your attention *à propos* of vegetable and fatty aliments. Now that you understand their composition, before studying the bases of Dietetics I must speak of Beverages. This I shall do in the next lecture.

*ON THE NURSING AND CARE OF THE INSANE.**

By Charles K. Mills, M.D.†

WITH many matters that are sometimes included in the published or oral instructions which are given to nurses and attendants upon the insane, it is not my purpose to deal in the present lecture. In the lectures delivered in the other departments of the Training-School, the surgical and the medical in particular, specific directions have been given with reference to many things necessary to be known by those who are in attendance upon the sick or injured, whether sane or insane, such subjects as, for instance, dislocations and fractures, sprains, wounds, and hemorrhages; artificial respiration; sunstroke; the recognition of different forms of insensibility; the use of compresses, poultices, stupes, and fomentations; and the treatment of bedsores and ulcers.

Little has been published with reference to the nursing and care of the insane, except what may be found under the head of treatment in the general text-books on insanity. Two or three small books have appeared, during the present year, in Great Britain and in this country. One, entitled "A Handbook for the Instruction of the Attendants on the Insane," was prepared by a sub-committee of the British Medico-Psychological Association, appointed at a branch meeting held in Glasgow on February 21, 1884, and has been published in this country by Cupples, Upham & Co., of Boston. It contains much useful information and valuable instruction, but too much attention is devoted to the consideration of elementary anatomy and physiology. A more valuable work is entitled "How to Care for the Insane," by W. D. Granger, M.D., first assistant physician in the Buffalo State Asylum for the Insane, and published by G. P. Putnam Sons, New York and London. I have obtained from both of these books some valuable facts, hints, and suggestions; but most of my remarks will be based upon observation and experience, and upon information obtained directly from specialists, and from the medical

* A lecture delivered before the nurses of the Training-School for Nurses of the Philadelphia Hospital, in the Insane Department of the Philadelphia Hospital. This lecture is part of a forthcoming book by Dr. Mills, entitled "How to Nurse and Care for the Nervous and the Insane," to be published by J. B. Lippincott Company.

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officers and attendants of insane hospitals with which I have been connected as consultant.

While a knowledge of the anatomy and physiology of the nervous system, and the nature of the different forms of insanity, may be of value to nurses and attendants, it is not strictly necessary that they should be fully informed about such subjects. There is, indeed, a certain danger that if too much attention is paid in the instruction of nurses and attendants to branches which belong, in strictness, to a true medical education, they may make the mistake of supposing that they are the doctors. The information absolutely necessary for nurses to have about the structure and functions of the nervous system can be compressed into a very small compass. It is necessary that they should know that the brain, with the details of the treatment of whose diseases they are sometimes intrusted, is an organ, which, although deeply seated within a thick and strong bony chamber, is subject, through the multitude of nerves which put it into communication with the outside world, to impressions which soothe, which annoy, which comfort, which distress, or which irritate.

It is well also that they should have some knowledge as to the forms of insanity and the special symptoms exhibited by certain patients; but, as already intimated, this knowledge need not be very extensive nor profound, but it should be exact as far as it goes. When it is remembered that even educated physicians, unless they have spent some time in the special study of insanity, have considerable difficulty in separating the different forms of insanity, it is easy to see that it would be folly for an individual who is not medically educated to try in a little brief instruction to obtain such information. The superficial features of a case will not enable an opinion to be reached as to its nature. Thus, in melancholia, which is a form of mental disease the essential feature of which is emotional depression, a patient sometimes has the violent outbreaks of agitation or excitement which are really the result of depression; and, conversely, a patient suffering from true mania may, for brief intervals, be in a state of great moodiness and depression. I might illustrate by references to other well-known forms of mental disease. What a nurse should know is that there are certain great divisions of diseases of the mind which give special symptoms, and that patients must be treated in this way or in that, according as they suffer from one or the other of these.

The doctor having once, in the presence of the nurse or attendant, clearly made the diagnosis of the form of mental trouble, the latter, knowing this, should bear certain facts in mind: should remember, for instance, that a case of melancholia is likely to be suicidal or to starve to death; that one of mania is not infrequently destructive or homicidal; that one of monomania may exercise duplicity, and may suppress for a time his delusions; that a dement is apt to be filthy, and not to take care of himself in any way; that an insane epileptic may one minute be peaceful and serene, and the next may be in a most dangerous motor or maniacal paroxysm. To illustrate still further, attendants should know that for various reasons accidents are very likely to occur among cases of paretic dementia,—the "general paretics," as they are commonly termed in the hospital. These patients,—although often exceedingly weak and frail physically,—owing to their peculiar mental condition, to their delusions of strength and grandeur, are likely to be demonstrative and pugnacious. Frequently they have weak hearts, or degenerated livers or kidneys; often, as in locomotor ataxia,—a disease closely allied in pathology, and often merging into it,—their bones are very brittle; not infrequently they have lung-troubles. If such patients are handled as roughly as a case of ordinary acute mania, the consequences may be serious. Collapse has been known to come on almost instantly in a patient of this kind after a struggle, and in badly-regulated asylums bones are sometimes broken,—these accidents occurring even when no cruelty or unusual violence is intended or attempted. Attendants should remember that, as a rule, these patients are not as strong as their demonstrations cause them to appear. A serious accident, resulting in the death of the patient and the subsequent trial of the attendant on a charge of manslaughter, occurred not long ago in one of our large hospitals, the patient being a general paretic with pugnacious and aggressive symptoms, but with advanced mental and physical degeneration. It is on just such matters as flow out of considerations of this kind that attendants require to be informed; they need that kind of knowledge of mental disease which will enable them to discriminate in their management of patients of different classes.

Dr. Spray says that they should be encouraged to take a scientific interest in their patients; and, properly understood, this assertion is true. I simply do not think that it

will be of any service to the unfortunate patient for them to become sciolists in psychiatry,—that is, to have a smattering of knowledge of the anatomy, physiology, and pathology of insanity to parade on occasions, or to make use of improperly in behalf of the patient; but the kind of scientific knowledge which they should have in order to manage the insane for their best interests is that which comes from a study of the mental, physical, and other qualities of their patients, and of the details of the best methods of handling them morally, mentally, and physically. They should study their patients; they should learn what gives them pleasure or pain: what, in cases of melancholia, will best serve to draw them out of the mental shell into which they have retired; in cases of mania, what will best answer to soothe and calm their stormy minds; what, in case of fixed delusions, will best divert them from the unhealthy channels into which their thoughts are directed.

They should have sufficient knowledge of what is meant by delusions, hallucinations, illusions, etc., to enable them to understand the mental condition of the patient for certain practical purposes which come within their own province. Not a few insane have delusions which they, for a time, or altogether, suppress, or which are not freely or openly expressed. The existence of such delusions in most cases is, indeed must be, known to the physician who has the patient in charge, and the nurse or attendant should be promptly informed, in order not only to guard against special dangers which may arise out of the delusions, but also to be better able to manage the unfortunate patient without offence or injury. An attendant who knows that the patient has delusions which may lead to mutilation will be on guard against the occurrence of mutilation. In one case of which I have knowledge, one of the patient's delusions took the form that it was his duty to destroy his eyes, because they had offended, and he almost succeeded in accomplishing this insane purpose before a new attendant had become properly informed as to the delusion.

Under the influence of peculiar delusions mutilations of a most extraordinary character are sometimes performed, and attendants should therefore always be upon the alert. To no one so much as to the insane does the old saying, that it is the unexpected that always happens, so fully apply. After, seemingly, almost every avenue for the commission of suicide or self-mutilation has been provided against, some new device will be put in action, and perhaps successfully. I recall one instance of a patient in a large hospital who was noticed speaking in a mumbling manner. He was at first passed by; but, on second thought, was questioned, and, on refusing to open his mouth, it was opened forcibly, and it was found that he had tied his tongue with a cord, which had caused it to be much swollen, and would probably in a short time have brought about sloughing, and possibly fatal hemorrhage. In this case the act was performed in all probability under the influence of a delusion that his tongue was an unruly member. Although not under my charge at the time of the occurrence, this man was at one time a patient of mine, and one of his delusions had reference to his tongue or speech.

It is well that nurses and attendants should know not only that the sane sometimes simulate insanity, but that the *insane* also sometimes simulate insanity, giving a curious combination of real and feigned disease, which is sufficient sometimes to baffle even a skilful expert. It is well that this should be appreciated, because it has happened to me, as well as to other physicians who are concerned with the care and treatment of the insane, that attendants, otherwise faithful and suitable for the work, become disturbed as to the existence of insanity in the patients whom they discover to be shamming in some particulars. They discover some deception, and with their little knowledge begin to think that they have solved the problem of the case better than the doctor himself.

Another similar point, which it is well, perhaps, that attendants should know, is that among the really insane hysteria in some form is often present. We have not only a form of insanity which is called hysterical, but hysteria in many forms manifests itself among the insane of different classes. I am led to remarks like these for practical reasons which have grown out of experience. I have had a faithful nurse come to me and say that a patient was hysterical; that she wished to create a sensation; that she would not hurt herself; and such statements may have had some foundation in truth; but in just such a case as this, also, I have known, within twenty-four hours of the time at which similar statements were made, the patient to almost succeed in committing suicide in a way that left no doubt for a moment even in the mind of the sceptical nurse. A nurse should not have an opinion which she puts in practice to the possible danger or detriment of the patient.

In the long run she will be safest to refer all doubts to the physician rather than to act upon them herself.

Later I will speak of the importance of cleanliness on the part of attendants, and also of the close attention which they should pay to cleanliness on the part of patients. Not only should cleanliness of body be attended to as a matter of great importance, but cleanness of speech and of heart are essentials for nurses and attendants upon the insane. A vulgar, profane, or immoral person has no right to be in charge of an insane patient.

If I were to be asked who make the best attendants, I should say young men or women, not necessarily overlearned, but bright, intelligent, sympathetic, and sensible persons. At one of the large asylums, in answer to my inquiries, I was told that on the women's side the young, strong Irish girls, on the whole, made the best attendants, for the reasons that, as a rule, they were strong, had good animal spirits, were quick, and, at the same time, were kind-hearted. A good nurse or attendant for the insane should be firm and yet forbearing, should be quick and yet not hasty, should be courageous and yet not aggressive, should have tact and yet not be deceitful. It has often been observed in large institutions for the insane that the coming of a new nurse or set of nurses will change for a time the conduct and character of a whole ward. Order will give place to confusion, and quietness to discord. A nurse who is fussy and too demonstrative is, above all, a nuisance, particularly in public institutions. A nurse should avoid lying to or deceiving the patients under her charge. Just as in the examination of the insane an occasion may arise when a doctor will be justified in resorting to stratagem or even to deception, so it is possible that a nurse or attendant in some grave emergency or peculiar position may be justified in temporarily deceiving a patient. Such occasions are, however, exceedingly rare, and deception should never be practised when it is in any way possible to avoid it. Most insane patients, unless they be dements, are capable of recognizing deceit and dissimulation in others. The tendency of the insane mind itself is often to deceit and dissimulation, and a part of the moral or psychical treatment of the insane should be the enforcement, by example, of good moral principle. Promises which cannot be kept should not be made.

The duties of a faithful nurse or attendant upon the insane are, as a rule, arduous and wearing. Sometimes a nurse may be put in charge of a private case—one of dementia or mild melancholia, for instance—which will give comparatively little trouble; but, on the whole, cases of insanity require great care and attention, and to be in charge of them is not to have a sinecure. In one of the large State hospitals with which I was formerly connected as consultant, the best and strongest attendants, after a year of faithful service, usually showed marked signs of physical and mental wear. The amount of service required by the regulations of some of the large asylums is, I think, too great, while, as a rule, the compensation is far too small.

The nursing and care of the insane in private practice is a matter of grave importance, and one which requires some special points of consideration. If sufficient means are at hand, some forms of insanity can be as well, or even better, treated at their own homes or in private houses than in hospitals or asylums, either private or public. Some forms of mental disorder are comparatively easy to manage at their own homes. Some, however, present peculiar difficulties. Among the cases most likely to be treated with success at their homes, with ultimate chances of recovery, are mild melancholia, common acute mania, when not too severe in character, and some forms of hysterical insanity. Some other forms of insanity, such as senile and secondary dementia, idiocy and imbecility of various grades, may be cared for at home, as a rule, without danger, although in such cases nothing is to be hoped for, so far as cure is concerned. The effort should never be made to treat patients at home, or in private houses, if such patients require constant watching, unless the friends or relatives of the patient are fully able to employ faithful attendants. The physician is often asked whether such and such members of a family cannot look after the patient. As a rule, but one not without exceptions, it is running a risk to allow a patient who is dangerous to himself or others to be attended solely by members of his family. It certainly cannot be done without great risk, if those who are supposed to have charge of the patient have other work or duties which claim their attention. When patients are so situated financially that attendants cannot be hired, or that members of the family or friends cannot give them exclusive attention, it is far better to resort to hospital or asylum care.

It will frequently happen in the private or home care of the insane that two attendants are put in charge of a patient; occasionally the number will be even greater. In all such

cases, unless the patient simply require one attendant to be in charge absolutely for a certain number of hours and the other for a like time, the physician finds it desirable to have one in chief authority. To one he consigns the chief charge, making him or her responsible to the physician, and requiring the other, when it is necessary, to act under instructions. Occasions arise, particularly in the care of the violent or suicidal insane, when it is necessary for prompt and decided action, such action as can be taken and directed by one clear head. In such a case it should be understood that the requests or even directions of the chief nurse shall be coincided with or obeyed by the other. I have known a patient to be injured, so far as efforts to control her were concerned, by the petty jealousies which have arisen between the nurses in attendance. It has seemed to me—possibly I may be mistaken with reference to this—that these jealousies are more likely to arise among women than among men. No appearance of discord or disagreement between attendants should ever be shown before a patient. Such an exhibition is in some cases destructive of all efforts to control a patient for his or her own good.

Much of the instruction which is given to those who are in charge of the insane, whether resident physician, nurses, or attendants, must necessarily have reference to the conduct, habits, and peculiarities both of patients and those in charge, and it is for this reason that I am compelled to devote so much time to the consideration of questions of this kind.

Attendants should never foolishly ridicule patients. While sometimes harmless amusement may be derived from listening to the vagaries of the insane whose delusions or notions are of a pleasant or joyous type, patients should never either be encouraged in their delusions or ridiculed because of them, or of anything else which is the result of their impaired mental condition.

In institutions nurses and attendants should be careful not to indulge in favoritism, and not to single out any patients for special antipathy. Probably nowhere in the same space can so many annoying, aggravating, and disagreeable individuals be found together as in a large insane hospital. It follows, as a matter of course, from the mental condition of the inmates, that this should be so; but the highest type of nurse or attendant is one who, appreciating all this, is able to pursue a straightforward, honorable, unbiased course in caring for the patient.

All disputes and differences of opinion should be referred to the physician. The highest tests of the quality of a good attendant in cases of mental disorder are those tests which are exhibited in the personal characteristics of the individual. Forbearance under temptation, the ability to suppress envy, jealousy, or self in every way; the willingness to do and deny all things for the sake of the patient, furnish the best evidences of the needed qualities in such an office. The nurse who is given chief authority in the care of a private patient should not be officious or exacting, but should make it her special aim to see that the directions of the physician are implicitly carried out; should report to the physician in charge everything disagreeable and all derelictions.

In most cases the chief nurse should keep a careful record of the details of treatment, and also of the meals, amount of sleep, exercise, kind of occupation or amusement, etc. A systematic method of recording the time of administration of medicines is also advisable.

Attendants upon the insane should not become to any great extent routinists. They should not become so familiar with their patients as to forget many of the little things that they may need. The insane often suffer for want of little things, of which they need not be deprived, and of which no one cares to deprive them, but which they often do not get because of carelessness or thoughtlessness. They often suffer, for example, for water. I have been told of an intelligent lady who drank her own urine, not because of a delusion, but because of absolute uncontrollable thirst, which was not properly satisfied. Such, probably, is the case in not infrequent instances, although acts of this kind are more frequently, no doubt, due to delusions.

Sometimes the insane do not receive sufficient food. In some forms of insanity, owing to the tremendous waste of tissue which takes place in consequence of the wearing mental disorder, large quantities of food are called for. Of course, arranging of the amount of food is a matter for the physician, but nurses should see to it that the food is given when directed. As a rule, however, the insane eat too much rather than too little, and this, of course, must be guarded against.

The protection of the insane from the commission of suicide is a most important duty upon the part of an attendant. It is strange in how many ways and with how much shrewd-

ness the insane will accomplish this dire purpose if intelligent vigilance is not exercised. Suicides by the insane, like suicides by the sane, are of the most diverse character as far as method is concerned. An insane patient has been known to hang herself by a shoestring or an apron-string to the door-knob of a room ; or the bed-cords, the sheets, clothing, etc., have been employed. To drown themselves patients do not require rivers nor even bath-tubs. They have been known successfully to accomplish this purpose by thrusting the head into a pail, or even into a basin of water. Sometimes objects are thrust by the patients into their own mouths to choke themselves or strangle themselves to death ; sometimes they cut themselves with glass obtained by breaking windows. Knives, scissors, razors, and all forms of cutting instruments should be carefully kept out of the way. The greatest possible care should be taken with reference to the custody of medicines administered to the patients. Here, again, it is advisable that those in charge should have some little practical instruction as to the strength and danger of the most potent remedies which are intrusted to their care for administration. They cannot be expected to have profound and exact knowledge as to the physiological properties, sources, etc., of morphine, conium, hydrobromate of hyoscine, atropine, duboisia, digitalis, chloral, cannabis indica, and the long list of powerful medicinal implements which are put into their hands ; but they should know that these drugs are dangerous and deadly poison in more than a proper dose, and they should keep them out of the reach of patients in the intervals between the times of giving the doses ordered. Where possible, it is well to keep them in an adjoining room, and always under lock and key, and entirely out of reach. While, however, in the case of patients suicidally inclined, the means of suicide should be kept or put out of reach, this should not be done in a fussy or demonstrative way.

Comparatively little restraint of a mechanical kind is now used in the care of the insane. In some cases, however, rare though they be, it may be absolutely necessary to protect patients from mutilation or suicide. Mechanical restraint should not be applied by an attendant except by the direction of a physician, and, if it is used, the greatest possible care should be taken that no evil consequences result. Not long since, in a large hospital for the insane, a patient, who had been restrained by straps or cords in a bed, so dragged himself down over the side of the bed as to actually cause his death by dragging on the bands.

When it becomes absolutely necessary to take hold of an insane patient, care should be exercised as to the manner in which it is done. Usually, patients requiring to be taken hold of are violent,—cases of mania, homicidal monomania, of agitated melancholia, and the like. When two attendants are present, it is well, while one secures the attention of the patient by demonstrations in front, for the other to get behind the patient, and either throw the arms around or seize both arms carefully but firmly above the elbows. Whatever plan of seizing patients is accomplished, great care should be taken not to inflict any injury. It is only in self-defence, in defence of life or limb in a great emergency, that an attendant is ever justified in roughly handling a patient. A patient, of course, may kick backwards when seized from behind, but the attendant, by slipping his feet and legs as far as possible to one side, can usually avoid being injured in this way.

When applications of heat or cold are made to the insane, special attention should be paid to them. In some forms of insanity great insensibility of the skin is present, and patients would in these cases allow blisters, mustard-plasters, stupes or fomentations, or any form of hot or counter-irritating applications to remain until serious blistering occurred. On the other hand, such patients are sometimes more impatient of such applications than the sane. The same remarks apply to the use of cold water or ice.

All physicians who are engaged in the care and treatment of the insane now recognize the importance of occupation, amusement, and educational training as therapeutic resources. To attendants the carrying out of plans of occupation, amusement, and teaching must be largely intrusted. In institutions, methods and measures for occupation, amusement, and teaching will be carefully planned and regulated if the institutions are up to the times in their management. The great curse of many institutions for the insane has been idleness. It is not within my design in the present lecture to go into the consideration of the methods and forms of employment, amusement, and instruction, but simply to give a few hints and suggestions as to the manner of carrying out the details, so far as these are in the hands of nurses and attendants.

Patients should be encouraged, and in some cases be compelled, to do that work which is called for in their own personal care. They

can be encouraged or made to take care of themselves, so far as cleanliness is concerned. Female patients should be made, when possible, to care for their own rooms, beds, etc., although attention should be paid, of course, particularly in private practice, to the question of the usual customs and habits of the patient.

No matter what may be the work at which an insane patient is engaged, whether sewing, knitting, quilting, ironing, or book-keeping, or, if a man, gardening, ploughing, brush-making, chair-making, or printing, a duty that will be incumbent upon the attendant more often than upon the physician will be to see that the patient does not overwork himself. While on the whole the tendency will be to do too little rather than too much, in some cases insane patients will rapidly and certainly overwork themselves. This is particularly the case in some forms of insanity attended with excitement, some varieties of mania, for instance, in which the patient tends to do everything to excess. Again, a patient may overwork as the result of some special delusion. Dr. Massey speaks of the case of a lady in good circumstances who, having been left with a family to support, resorted to dressmaking, but became insane and was sent to an asylum, where she was induced to go to work in the sewing-room. The result was the production of a new delusion: she believed she was in charge of the sewing-room, with large wages, and made great exertions in consequence. Becoming troublesome, she was transferred to the laundry, where the same thing was re-enacted, resulting at last in complete exhaustion and confinement to bed.*

Exercise is of the utmost importance to many insane patients. In suitable weather, out-of-door exercise should be secured. Here, again, the careful attendant will guard against the patient under-exercising on the one hand or over-exercising on the other.

Torpor of the bowels and obstinate constipation are of such frequent occurrence among the insane that both resident physicians and attendants should have their attention particularly directed to their management. In cases of melancholia, the bowels may remain constipated for days and even weeks, if the patients are neglected. A large number of insane patients in asylums, particularly many of the cases of dementia, are troubled with involuntary evacuations from the bowels or bladder, particularly at night. In private patients the same difficulty may be encountered, and it is well for physicians and nurses to have some plan of meeting the difficulty. In one large hospital the plan adopted is a very sensible one. The physician in charge has a list of all patients who are troubled in this way, and in the evenings, before retiring, injections of warm water are given. The lower bowel is thus emptied, and a probability is that the patients will not soil their beds.

Cleanliness on the part of a nurse or attendant upon the insane is of the utmost importance. It is important not only for itself, but for the example which it sets to the patient. The insane may be made more filthy than their mental affliction would lead them to be by the example set to them by others; on the other hand, they may become cleanly in habit simply from a good example steadily set.

The bathing of insane patients is a matter of great importance both from the point of view of cleanliness and as a therapeutic agent, and attendants should be thoroughly instructed with reference to this matter. They should also have a lively appreciation of the dangers which may attend bathing. Only the other day a terrible accident occurred in one of the large asylums of a neighboring State, the patient having been literally parboiled by an attendant. As many insane patients make a great fuss and offer much resistance to bathing at all times, a careless or impatient attendant might fail to listen or assure himself of the conditions. Rigid rules are prescribed in all well-regulated public institutions. The rules for bathing which are in force at the State Hospital for the Insane, Norristown, Pennsylvania, so fully express what should be said with reference to this matter, that I will quote the most important of them:

The ward captains will personally supervise the bathing of patients, which shall not be conducted during their absence without permission.

Every patient is to be bathed immediately after admission, and once a week afterwards, unless excused by medical order. Should there be the least doubt as to the advisability of bathing any patient, owing to sickness, feebleness, or excitement, the matter should be immediately reported to the medical officer.

To provide against catching cold, the captains will see that the bath- and dressing-rooms are sufficiently warmed at bathing times; otherwise, to postpone bathing until the rooms are heated.

Any marks, bruises, wounds, sores, pain, or evidence of disease complained of by the patient, or noticed during any of the bathing operations, must be immediately reported to the physician.

During the use of the bath the room is never to be left by the attendant, except by special permission of the resident physician. When the room is not in use the door must be kept locked.

* *Penn Monthly*, 1879.

Before putting the patient into the bath observe that the water is of proper temperature. It should not be less than 88° nor above 98°.

Never turn on the hot water when the patient is in the tub.

In the bath the body of the patient is to be well cleansed with soap, and in washing the hair be careful that no soap gets into the patients' eyes. After leaving the water especial care must be taken to thoroughly dry the patients and clothe them as rapidly as possible. A separate towel must be provided for every one.

Under no pretence whatever is a patient's head to be put under water.

An attendant must not attempt under any circumstances to bathe a struggling patient alone.

Cold baths must never be given.

Neither before nor after the bath will patients be allowed to stand about unclothed.

The keys are never to be left on the bath-taps, nor are they to be used by the patients.

In conclusion, I will speak briefly of the methods of feeding patients forcibly. I do this because my remarks are intended for the instruction of resident physicians as well as of nurses and attendants. I do not believe that the latter should be allowed to have the feeding of patients in this manner under their own charge, but, as it is necessary for them to assist in performing this work, they should receive instruction as to the whole process in order that they may be better able to render assistance to the physician. In some institutions head-nurses have been allowed to administer food in this way, but it is contrary to the regulations of most institutions for the insane.

Not a few cases of insanity require at times to be fed by force. The cases in which such treatment is called for differ somewhat. In melancholia, patients will allow themselves to rapidly run down in health, or even starve to death, if the food is not promptly administered by artificial means. Sometimes cases of mania will refuse to take food, either because of their general excitement and combativeness or because of delusions. Paranoiacs or monomaniacs refuse food, if at all, because of some fixed delusion. A case of chronic alcoholic insanity, or even, in rare instances, a paretic dement, may refuse food because of a delusion, one, for instance, that the food is being poisoned by physicians, attendants, or others, or that it is a means resorted to to accomplish some purpose on the part of a persecutor. The refusal of food by the case of hysterical insanity, like the apparent attempts at suicide, is usually simply put on or resorted to for the purpose of exciting sympathy. In most cases these patients will obtain food on the sly if possible, but sometimes they will carry on the deception sufficiently long to injure themselves if the attendants do not resort to active interference.

Various plans of feeding patients by force have been recommended at different times,—two of these are now almost universally employed; and one of the two, namely, nasal feeding, is now coming more and more into general use.

One plan is that of holding the nostrils closed and opening the mouth, or thus compelling it to be opened, while the food is quickly poured into the mouth and the patient is forced to instantaneously swallow it. A certain amount of danger accompanies this plan, which, by the way, is the one often resorted to for recalcitrant children. If any one of you should try the experiment of swallowing liquids or solids while the nose is tightly held so that no air can enter through it, he will find that it is a very difficult or almost impossible thing to accomplish. The very fact that a patient or individual whose nose is held opens the mouth in order to breathe shows the source of possible danger, which is, that the glottis being open to receive air into the lungs at the same moment that food is hastily thrust into the mouth, some of the food is likely to find its way into the windpipe and thus choke or strangle or partially choke or strangle the patient. This method of feeding is now not much employed.

Dr. D. Anderson Moxey* was among the first to call attention to the administration of food and medicine by the nose when they could not be given by the mouth. He resorted to this method in cases of insanity, inflamed and ulcerated sore throat, in glossitis, in deep intoxication, and in infancy, where nothing could be administered by the mouth or retained by the rectum. In his cases of insanity he fed his patients, without the use of a tube, by simply holding a small wedgwood funnel in one of the nostrils, and pouring through it the liquid or semi-solid nourishment. His method with insane patients is described as follows: After first trying to induce the patient to take the nourishment quietly and in the ordinary way, he summoned three attendants at least (four or five if they could be had), and laid the patient down on his back as quietly as possible on a low couch in the middle of the room. If there were only three attendants, one controlled the legs and the other two the arms. If a fourth was present, he attended only to the head, which was

* *The Lancet*, March 20, 1869.

held between his knees as the attendant sat on a low stool at the top of the couch. If a fifth was present, he assisted in holding down the legs. In this way the patient was completely controlled, and sometimes would yield and swallow in the usual way. Then introducing the end of the funnel gently into one of the nostrils, he poured the liquid slowly into it, pausing now and then to allow the patient to take a deep inspiration, and not allowing the food to accumulate in the funnel. A determined patient would generally be able to sputter a little of it out of his mouth. When such was the case, he poured the contents of the jug faster into the funnel, and sometimes obstructed the other nostril. In troublesome cases a medical man ought, he insisted, to invariably administer the draught, as he could alone properly judge of the extent to which it was necessary to interrupt nasal respiration. Dr. Moxey never found any serious results from this method of feeding. I have referred to these observations of Dr. Moxey to show the perfect feasibility of nasal feeding, and one of the methods of holding the patient, and that the feeding can even be accomplished without the aid of a tube, although undoubtedly this is the neater and better method.

A good tube for feeding by the nose can be made by attaching a soft Nélaton catheter to a long piece of drainage-tube of a calibre which will just allow the catheter to tightly fit into it. To the extremity of the drainage-tube a funnel of large size should be attached.

In nasal feeding some of the difficulties and dangers which are met with should be borne in mind. The number of patients who cannot be fed by the nose is very small. Occasionally, however, a patient is found whom it seems impossible to feed in this way, owing to the choking or strangling produced. This may be because of some peculiar anatomical conformation, or some special nervous idiosyncrasy on the part of the patient. The patients I refer to will choke or strangle with nasal feeding when they will not when the stomach-tube is resorted to. If, when the attempt is made to pass the well-oiled tube through the nostril, resistance is encountered, and if, after a few trials, the tube cannot be made to pass, great force should not be employed by the operator, but at once the tube should be withdrawn, and the effort made to pass it through the other nostril. In nearly all cases where special resistance is offered on one side, the tube will pass with ease upon the other; and this in most instances is because, if hypertrophies or projections exist upon one side, there will be upon the other corresponding or compensating depressions. Sometimes, but rarely, the mucous membrane is exceedingly irritable. After the nasal tube has passed through the nostrils, it seems to have a peculiar tendency in some cases to drop into the glottis, the patient struggling and attempting to scream meanwhile. Some patients will spit or force the tube out into the mouth, and attendants can, sometimes, through the mouth, keep the tube, which has been passed through the nose, in position. Occasionally the nose is made sore by the use of the tube, but this is not likely to occur if the tube is always perfectly cleaned and well oiled. If it is of the proper kind,—that is, a soft tube,—there will be no danger of injuring the parts by breaking or perforating the mucous membrane. Indeed, one of the advantages of the nasal tube over the form of stomach-tube, or œsophageal tube, that is commonly employed, is that the danger of injury by perforation or abrasion is much less. The stomach-tube must be a little larger and of firmer make, and is likely, after a little usage, particularly if not looked after with great care, to become stiff and hard. I have heard of one instance in which the œsophagus was pierced by a stomach-tube in the hands of an unskilful attendant. In using the nasal tube great care should always be exercised to see that at least fourteen to sixteen inches of the tube have been passed before beginning the feeding. This will make it certain that the entrance to the wind-pipe has been passed. Of course care should be taken to observe that the tube has not doubled on itself, but this will not be likely to occur, or to be overlooked if it does occur.

"Whether fed with the funnel or the stomach-pump, the patient should sit up, and, if he is very obstructive, a restraining-chair will save the patient much needless muscular exertion, the physician much trouble, and diminish the chances of doing an injury. In case the œsophageal tube is passed along the floor of the nasal cavity, it is apt to encounter a resistance, and be deflected forward by a prominence which is sometimes very marked on the posterior pharyngeal wall, and which corresponds to the bodies of the cervical vertebræ. Dr. Tuke advises throwing the head of the patient back at the moment when the sound approaches the posterior nares, the tube having previously been bent a little, so as to facilitate its downward passage; then, at the

moment when it is about to glide down into the œsophagus, when there is a risk of its passing into the larynx, he advises the head to be brought forwards and downwards, so as to send the point against the posterior wall of the pharynx. After passing the upper end of the œsophagus, the tube is usually swallowed, as it were, and glides down without any further difficulty into the stomach through the action of the constrictor muscles."*

Whenever a patient is fed forcibly, care should be taken to have ample force to restrain him without violent struggle. The sight of overwhelming force will have a good moral or psychical influence over the patient. Three persons can feed a patient successfully, no matter how great the inclination to resist, if these persons are skilful and have sufficient strength. With less than three persons the difficulty will be very great, and in some cases it will be impossible successfully to accomplish the purpose. One attendant should always be charged with the task of firmly holding the head in position; another can hold the arms and hands, with the body thrown over the limbs of the patient,—before this is attempted the patient having been well enveloped in a blanket or sheet. It is better, however, to have two attendants hold the arms and legs of the patient.

After a patient has been fed the tube should be always promptly cleansed. An attendant who does not attend to this matter is derelict in duty. Hot water cannot be used because of the melting of the india-rubber, but the tubes should be washed by allowing cold water to run through them and be passed over them. Negligent attendants are likely to neglect this matter.

Whether fed by the mouth and œsophagus or through the nose, in rare instances, patients learn to vomit or regurgitate the food. If this occur, it is a matter for a physician rather than for a nurse or attendant. It has been found that the administration of morphine and hyoscyamine prior to the time of feeding will prevent the patient from exercising this power.

If the nasal mucous membrane or the mucous membrane of the throat should be unusually irritable, resort may be had to a weak solution of the hydrochlorate of cocaine, which can be painted over the mucous membrane of the nose or throat in those cases in which it could be done without too great effort.

* Insanity, its Classification, Diagnosis, and Treatment. By E. C. Spitzka, M.D.

A CONTRIBUTION TO OUR KNOWLEDGE OF FEVER, AND THE AGENTS WHICH PRODUCE OR ARREST IT.

By Drs. H. C. Wood, E. T. Reichert, and Hobart A. Hare.

(Continued from page 583.)

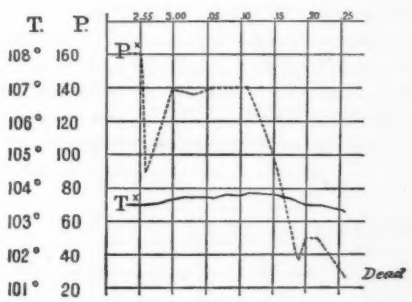
Part II.—Pyrexia.

THE fever produced by pepsin is so marked that we have been led to study closely the phenomena produced by these injections, thinking that they might throw some light upon the pathology of the febrile process. The first series of experiments were directed to determining whether the relations between the temperature of the body, the state of the pulse, and the respiration are in any way fixed or definite.

These experiments are as follows:

Experiment 20.—Dog; weight, 24 pounds. Hance Bros. & White's concentrated pepsin.

Time.	Press.	Pulse.	Resp.	Temp.	Remarks.
2.55	160	138	15	103.5°	
2.56	.....	.....	...	.....	Slowly injected 2 grammes intravenously.
2.57.40	90	144	13	.....	
2.58	80	132	...	103.5°	
3.01	140	108	20	103.7°	
3.06	142	180	24	103.7°	
3.11	140	?	36	103.8°	Respirations deep.
3.15	89	.....	...	103.8°	
3.20	50	156	23	103.5°	
3.22	52	.....	18	103.45°	At 3.26 animal died of heart failure.



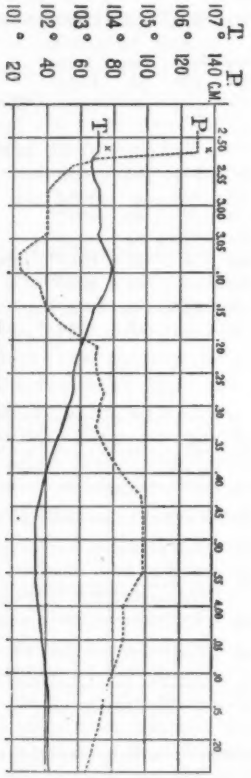
EXPERIMENT 20.

Experiment 21.—Dog; weight, 16.5 pounds.

Time.	Press.	Pulse.	Resp.	Temp.	Remarks.
2.52	150	132	4	103.5°	Injected in next 45 seconds 1.65 grms. of Hance Bros. & White's concentrated pepsin.
2.53	80	204	...	103.3°	
2.55	50	196	...	103.4°	
2.57	44	156	15	103.5°	
3.03	30	180	...	103.6°	

Time.	Press.	Pulse.	Resp.	Temp.	Remarks.
3.07	30	.....	...	103.9°	
3.15	44	.....	...	103.5°	
3.21	75	156	16	103°	
3.28	90	144	16	102.8°	
3.38	80	144	20	102.1°	
3.55	90	192	18	101.7°	
4.10	78	216	16	102°	
4.40	45	216	18	102.2°	
5.20	62	240	40	101.9°	Dog dies within 12 hours.

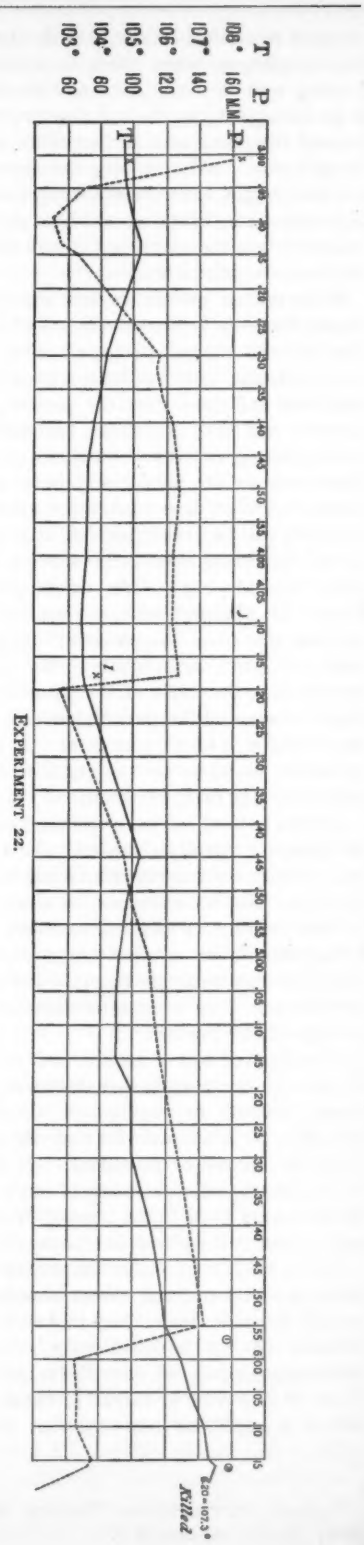
It will be seen in these two experiments that the pulse-rate was very distinctly increased, whilst the arterial pressure steadily fell, and the temperature either fell or was but slightly affected. The respirations were increased. In order to show to the eye the relations between these alterations, the curves have been prepared. In these the line P represents the pressure, the line T the temperature.



These curves certainly demonstrate that, after injections of pepsin, which either depress or do not affect the bodily temperature, there is no close relation between alterations in the general circulation and the bodily temperature.

The next two experiments were so made as to produce fever. They are as follows:

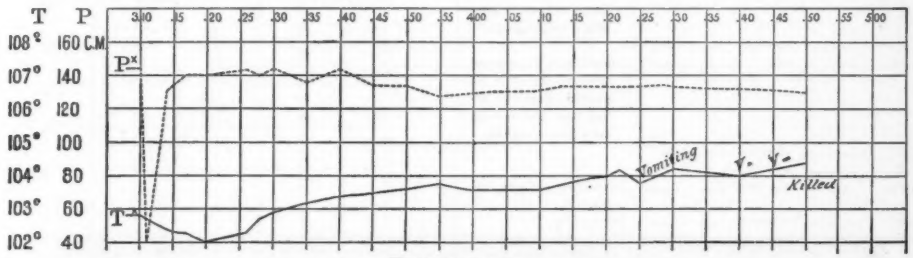
Experiment 22.—Dog.



Time.	Press.	Pulse.	Temp.	Remarks.
3.01	160	156	104.7°	Slowly injected 1 gramme of concentrated pepsin.
3.05	75	216	104.8°	
3.13	60	216	105.2°	
3.30	120	180	104.2°	
3.45	122	168	103.8°	
4.10	120	170	103.5°	
4.19	.....	.....	.....	Slowly injected 0.75 gramme.
4.45	95	216	105.1°	
5.00	115	220	104.6°	
5.20	120	218	105°	
5.40	135	240	105.7°	
5.55	140	192	106°	Bled about 2 ounces.
6.00	70	252	106.7°	
6.10	70	250	107.6°	
6.20	75	288	107.3°	Dog killed.

Experiment 23.—Dog ; weight, 12.5 pounds.

Time.	Press.	Pulse.	Temp.	Remarks.
3.09	140	144	102.8°	Injected slowly 0.63 gramme.
3.10.30	40	132	102.7°	
3.17	135	108	102.3°	
3.26	142	120	102.3°	
3.30	150	132	102.9°	Very decided tremors for some minutes.
3.40	140	132	103.4°	Tremors cease.
3.50	136	156	103.6°	
4.10	138	168	103.6°	
4.20	133	156	104.0°	
4.25	130	156	103.9°	Vomiting.
4.30	130	168	104.1°	
4.50	130	168	104.2°	Dog killed.

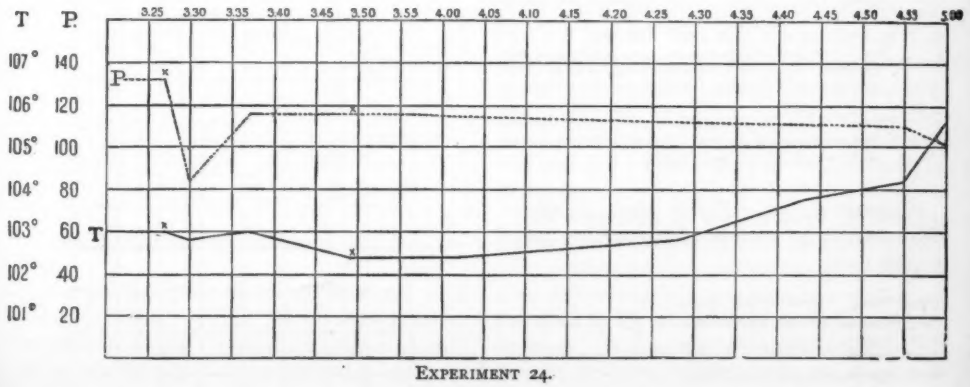


EXPERIMENT 23.

Unfortunately, in these experiments we failed to note the respirations ; but, as with the previous experiment, the pulse-rate rose and the arterial pressure fell, and yet the temperature rose. In Experiment 22 the rise of temperature, considering the animal employed, was very decided.

The following curve expresses the results obtained in an experiment (Experiment 24), whose detail we do not give.

In order to show more clearly the total lack of connection between the circulation and the temperature in ordinary cases of fever, we here insert some experiments which we have made with antipyretics, especially with the drug antipyrin. In three or four experiments upon uninjured normal dogs we have found that this drug sometimes notably depresses the temperature even when given in doses not distinctly toxic. We now give the records of three experiments so made as to show simultaneously the influence of antipyrin upon animal temperature and upon arterial pressure, two of the experiments being upon normal animals and one upon an animal having a pepsin fever.



EXPERIMENT 24.

Experiment 25.—*Antipyrin alone.* Weight of dog, 6 pounds. No pepsin given. Effects of antipyrin on normal temperature and blood-pressure.

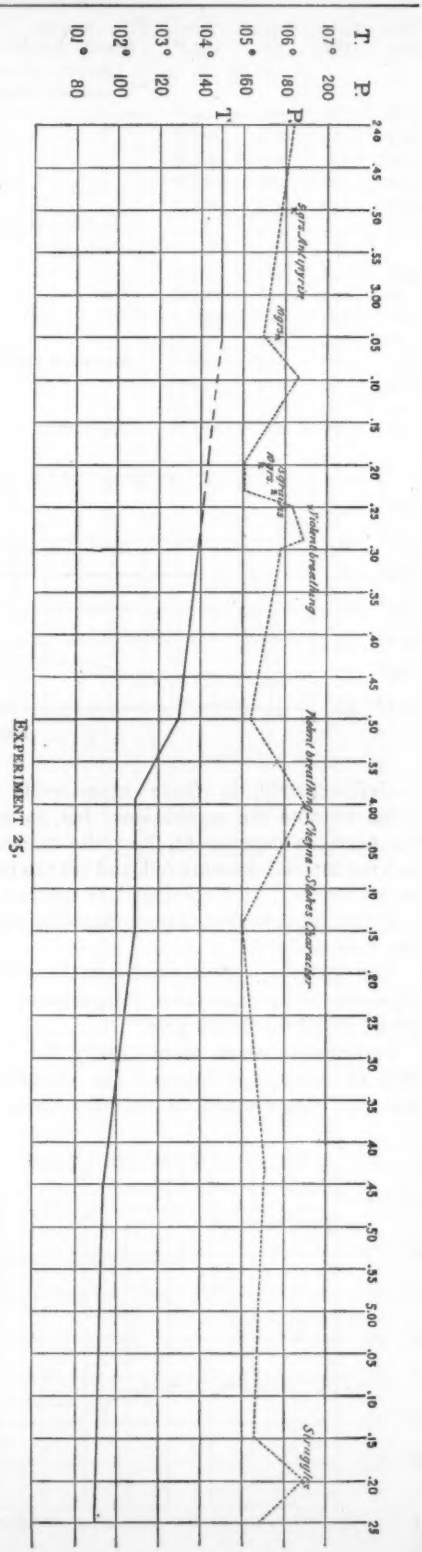
Time.	Drug.	Press.	Pulse.	Temp.	Remarks.
2.35	.....	194	.....	104.5°	
2.40	.....	170–194	.....	.....	
2.45	5 grms.	180	.....	.....	
2.46	.....	170–190	.....	.....	
2.47	.....	170–190	.....	.....	
3.05	10 grms.	168–170	.....	.....	
3.06	.....	.....	.....	.....	Lost blood.
3.07	.....	186–188	.....	.....	
3.19.50	.....	160.162	.....	.....	
3.20	10 grms.	160–164	.....	.....	
3.22.50	.....	160	.....	.....	
3.23	15 grms.	160	.....	.....	
3.25	.....	180–190	.....	.....	Violent breathing.
3.27	.....	180–196	.....	.....	
3.30	.....	178–180	.....	.....	
3.50	.....	160–170	.....	103.5°	Stopped breathing for 1 or 2 minutes, then began to breathe hurriedly and slightly.
4.	.....	190–192	.....	102.5°	
4.15	.....	160	.....	102.5°	Breathing in paroxysms arrested for 10 to 20 seconds, then breathing fast and strong for 3 to 10 seconds.
4.30	.....	160–164	.....	102.1°	
4.45	.....	170–180	.....	101.7°	
5.15	.....	164–170	.....	.....	Breathing a little improved.
5.20	.....	180–200	.....	.....	Struggling.
5.25	.....	170–180	.....	101.5°	Dog when untied strong and lively.

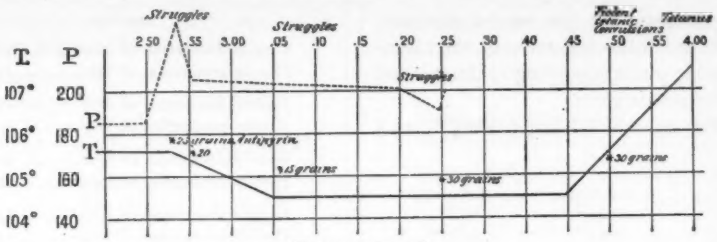
Experiment 26.—Bull-dog; weight, 30 pounds. Effects of antipyrin on normal temperature and pressure.

Time. P.M.	Drug.	Press.	Pulse.	Temp.	Remarks.
2.50	.....	180–190	150	105.3°	Has been struggling.
2.53	25 grms.	184–190	150	.....	
2.53.02	.....	220–244	not countable.	.....	Tracing irregular; dog struggling.
2.55	.....	210–220	120	.....	
2.55.10	20 grms.	195–220	110–120	.....	Struggling.
3.05	.....	200–210	180	104.5°	
3.06	15 grms.	196–200	180	.....	
3.06.02	.....	.....	.....	.....	Struggling.
3.20	.....	200	200	.....	
3.25	30 grms.	180–200	180	.....	
3.25.02	.....	200	120	.....	Struggling.
3.45	.....	.....	.....	105°	
3.50	30 grms.	.....	.....	.....	Violent tetanic convulsions.
4.	.....	.....	.....	107.3°	Tetanus.
4.	Dog in perpetual violent tetanus. Excessively rigid opisthotonos. Unusually hurried breathing. Dilated pupils. Lies on side. Conscious. Handling causes violent general convulsion.				
5.	Tetanus replaced at intervals by wildly excessive and very frequent clonic convulsions. Lies on side and moves legs with unusual rapidity, as if running.				

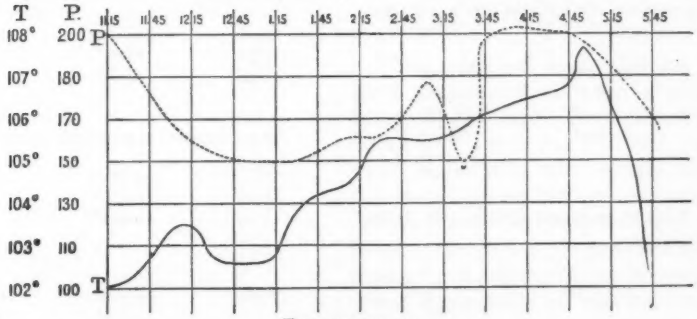
Experiment 27.—*Pepsin and Antipyrin.* Cur; weight, 30 pounds. Filtrate from boiled pepsin used.

Time.	Drug.	Press.	Pulse.	Temp.
11.15	.....	196–200	84–86	102.2°
11.16	4 grms. pepsin.	.....	.....	.....
12.08	4 grms. pepsin.	160–174	.....	103.5°



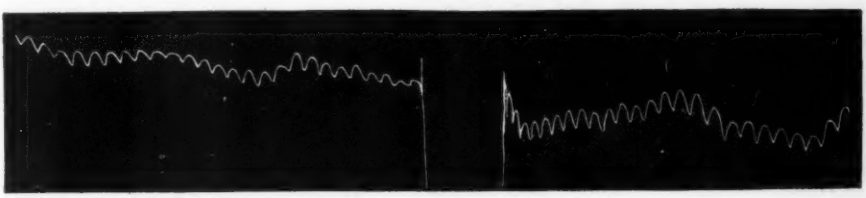


EXPERIMENT 26.



EXPERIMENT 27.

R. T. 107.7° R. T. 102.3°



3 P.M. 3.45 P.M.

EXPERIMENT 28.

Time.	Drug.	Press.	Pulse.	Temp.	Remarks.
12.17	4 grms. pepsin.	160	150	.....	
12.19	3 grms. pepsin.	160–164	180	.....	
12.20	.....	.....	.....	102.8°	
1.	.....	Clots.	Clots.	.....	
1.05	.....	140–150	.....	102.5°	
1.30	.....	150	.....	104°	
2.	.....	160	186	104.4°	
2.30	.....	150–160	132	105.5°	
3.	.....	170–190	120	105.5°	
3.30	.....	140–160	138	105.7°	
3.40?	anti-pyrin, either 20 or 30 grms.	200	.....	.....	Amount of antipyrin is somewhat doubtful here.
4.45	.....	200	132	106.7°	Breathing convulsive.
4.55	.....	.....	.....	107.7°	Dog quiet.
5.40	.....	160	138	102.3°	Quiet.
5.41	.....	.....	.....	.....	Killed dog.

Dog struggling violently ever since injection.

Comparing these three experiments with those previously given, the conclusion is inevitable that the temperature of the animal, after the injection of the pepsin, is independent of pulse-rate, the arterial pressure, and the rapidity of the respirations.

As a further proof of this entire independence of the blood-pressure and the temperature we give the above tracing. The temperature in a dog (Experiment 28) had been elevated to 107.7° F., at which time the arterial pressure was 170: antipyrin was injected into the jugular vein, and the motion of the kymographion arrested for forty-five minutes, at the end of which time the temperature had fallen to 102.3° F.: nevertheless, the blood-pressure stood at 164, almost where it had been before the falling of the bodily temperature.

The next step in the investigation was to determine the course of heat production and heat dissipation. A series of experiments were performed with a calorimeter similar to that used by Dr. H. C. Wood in his researches on fever. It does not seem necessary to encumber the present article with the details of

these experiments, but the results obtained are given in the following records, the calculations all being made according to the method of the above investigator.

Experiment 29.—A fat pup; weight, 19.5 pounds.

Time.	Rec. temp.	Cal. temp.
8.40	104.6°	63.8°
10.40	104.2°	65.57°
		1.77°

11.10 4 grammes concentrated pepsin into jugular vein.

Time.	Rec. temp.	Cal. temp.
11.40	105.4°	.....
12.15	105.4°	65.25°
12.15	105°	66.33°
		1.10°

Dog has bloody mucous discharges from rectum; very sick.

Time.	Rec. temp.	Cal. temp.
2.30	105°	66.33°
4.30	102.30°	67.43°
		1.10°

Dog very sick and feeble; died during the night.

RESULTS.

Hourly heat dissipation.....	107.97
Hourly heat production.....	105
Hourly heat dissipation.....	91.98
Hourly heat production.....	93.00
Hourly heat dissipation.....	67.1
Hourly heat production.....	47.31

Experiment 30.—Dog; weight, 19 pounds.

Time.	Rec. temp.	Cal. temp.
8.45	102.6°	60.37°
10.45	102.4°	62.6°
		2.23°

11.15 Injected 4 grammes concentrated pepsin.

Time.	Rec. temp.	Cal. temp.
12.5	101.2°	61.72°
1.5	.....	62.84°
2.35	104.4	64.51°
		2.79°

Dog vomited in box.

Time.	Rec. temp.	Cal. temp.
3.10	104.4°	64.22°
4.10	.....	65.29°
5.10	.....	66.29°
5.40	104.2°	66 68°
		2.46°

Time.	Rec. temp.	Cal. temp.
8.40	102.4°	67.16°
9.40	.....	68.12°
10.10	102.2°	68.54°
		1.38°

RESULTS.

Hourly dissipation of heat.....	136.03
Hourly production of heat.....	134.88
Hourly dissipation of heat	136.152
Hourly production of heat.....	154.312
Hourly dissipation of heat.....	120.995
Hourly production of heat..	120.048
Hourly dissipation of heat.....	113.652
Hourly production of heat.....	112.24

Experiment 31.—Terrier; weight, 16 pounds.

Time.	Rec. temp.	Cal. temp.
8.30	102.5°	60.93°
10.30	102.5°	62.13°
		1.20°

11.50 Injected 4 grammes of concentrated pepsin.

Time.	Rec. temp.	Cal. temp.
12.10	103°	61.85°
1.40	100.8°	62.7°
		.85°

Time.	Rec. temp.	Cal. temp.
1.55	100.8°	62.6°
3.25	106.7°	63.23°
		.63°

Time.	Rec. temp.	Cal. temp.
3.42	106.7°	63.4°
5.03	105.3°	64.3°
		.9°

RESULTS.

Hourly dissipation of heat.....	73.2
Hourly production of heat.....	73.2
Hourly dissipation of heat.....	79.12
Hourly production of heat.....	63.92
Hourly dissipation of heat.....	51.24
Hourly production of heat.....	97.54
Hourly dissipation of heat	82.35
Hourly production of heat	72.27

Experiment 32.—Dog; weight, 6½ pounds.

Time.	Rec. temp.	Cal. temp.
9.00	103.4°	62.88°
11.00	102.4°	64.78°
		1.90°

Time.	Rec. temp.	Cal. temp.
11.50	Injected 1 gramme of concentrated pepsin.	
12.25	102.4°	64.66°
2.25	105.4°	66.4°
		1.86°

Time.	Rec. temp.	Cal. temp.
2.50	105.4°	66.45°
4.50	103.6°	68.36°
		1.91°

RESULTS.

Hourly dissipation of heat.....	71.78
Hourly production of heat.....	69.33

Hourly dissipation of heat..... 70.2801
Hourly production of heat..... 77.57

Hourly dissipation of heat..... 72.1693
Hourly production of heat..... 67.7593

Experiment 33.—Dog; weight, 13 pounds.

Time.	Rec. temp.	Cal. temp.
12.40	101.8°	884°
1.40	102.2°	958°
2.10	4 grammes of pepsin concentrated. Dog in a few minutes became very ill; whining expiration; dilated pupils.	

Time.	Rec. temp.	Cal. temp.
2.35	102.5°	60.6°
4.35	99.2°	61.6°
		1°

Time.	Rec. temp.	Cal. temp.
5.05	99.2°	62.0°
7.20	99.2°	63.1°
		1.1°

Time.	Rec. temp.	Cal. temp.
7.35	99.2°	63.3°
8.50	99.4°	64.1°
		0.8°

Dog excessively ill; died during next twenty-four hours.

RESULTS.

Hourly dissipation of heat..... 73.2
Hourly production of heat..... 77.1

Hourly dissipation of heat..... 61
Hourly production of heat..... 45.92

Hourly dissipation of heat..... 67.1
Hourly production of heat..... 67.1

Hourly dissipation of heat..... 78.08
Hourly production of heat..... 77.92

Experiment 34.—Dog; weight, 35 pounds.

Time.	Rec. temp.	Cal. temp.
10.57	101.6°	70.26°
12.27	101.2°	72.22°
		1.96°
12.40	4 grms. concentrated pepsin.	

Time.	Rec. temp.	Cal. temp.
1.35	101.2°	72.32°
3.35	105.4°	74.22°
		1.90°

Time.	Rec. temp.	Cal. temp.
4.05	105.4°	74.38°
6.05	103°	76.38°
		2.00°

Time.	Rec. temp.	Cal. temp.
6.25	103°	76.28°
8.25	101.8°	77.72°
		1.44°

The tabulated results of these experiments are as follows (see table on p. 672):

RESULTS.

Hourly dissipation of heat..... 159.42
Hourly production of heat..... 152.30

Hourly dissipation of heat..... 115.9
Hourly production of heat..... 171.025

Hourly dissipation of heat..... 122
Hourly production of heat..... 90.55

Hourly dissipation of heat..... 87.84
Hourly production of heat..... 62.09

It has occurred to us that the results of these experiments might graphically be represented, and their lessons thereby be conveyed more forcibly to the mind. If on paper ruled horizontally with equally distant lines the space between the lines be considered to represent one degree of bodily temperature, then, so far as heat production and heat dissipation are concerned, such space will represent the number of heat units required to raise the body of the animal one degree of temperature: thus, suppose in a ruled sheet the successive distances between the lines A, A′, A″, represent 1° F. for an animal weighing six and a half pounds, and having a specific heat of 0.75, then the value of the spaces between A, A′, A″, will each be five units of heat.

If across the horizontal lines in such a plate a series of vertical lines be projected at intervals, and taken to represent each hour of the experiment, it is easy to construct three curves,—one of bodily temperature, one of heat dissipation, and one of heat production. If such curves be correct, the one representing temperature should be exactly related to the others.*

This relation should be, that when the temperature rises, the hourly increase of heat production added to the hourly decrease of heat dissipation and multiplied by the number of hours should give the height of the temperature curve. Perhaps this may be more clearly expressed algebraically. Let t represent the height of the temperature curve, ip hourly increase of heat production, dd hourly

* In practice, for convenience' sake in making these curves strict accuracy has been by us abandoned. The weights of the various animals are such that only occasionally does the space between the lines represent an even number of heat units, and we have found it better to consider them to represent the nearest even number than to retain the fractions. The departure from accuracy is not sufficient to affect perceptibly the general relations of the curves, but comes out when accurate measurements are made.

Experiments.	Time.	Weight.	Drug.	Temperature.	Hourly dissipation of heat.					Hourly production of heat.					Remarks.
					Normal.	After Injection.	Increase.	Decrease.	Percentage of decrease.	Normal.	After Injection.	Increase.	Decrease.	Percentage of decrease.	
29	8.40 to 10.40 A.M. (2 hours).	19.5 pounds.	.....	104.6° to 104.2°	107.97	.....	.....	.....	.....	105	.....	.....	.....	.....	
	12.15 to 2.15 P.M. (2 hours).	.....	4 grms. pepsin 11.10 A.M.	105.4° to 105°	.....	91.98	.....	35.99	.....	.....	93.90	.....	31.10	.....	Dog died.
	2.30 to 4.30 P.M. (2 hours).	.....	.....	105° to 102.3°	.....	67.1	.....	40.87	.....	.....	47.1	.....	58.7	.....	Dog had a running sore on back; very ill after injection, with bloody diarrhœa, etc.
30	8.45 to 10.45 A.M. (2 hours).	19 pounds.	.....	102.6° to 102.4°	136.03	.....	.....	.....	.....	134.88	.....	.....	.....	.....	
	12.5 to 2.35 P.M. (2½ hours).	.....	4 grms. pepsin 11.15 A.M.	101.2° to 104.4°	.....	136.152	.....	0.122	.....	.....	154.31	20.23	.....	.....	
	3.10 to 5.40 P.M. (2½ hours).	.....	.....	104.4° to 104.2°	.....	120.995	.....	15.035	.....	.....	120.048	.....	14.832	.....	
	8.40 to 10.10 P.M. (2½ hours).	.....	.....	102.4° to 102.2°	.....	113.652	.....	22.378	.....	.....	112.24	.....	22.64	.....	
31	8.30 to 10.30 A.M. (2 hours).	16 pounds.	.....	102.5°	73.2	.....	.....	.....	.....	73.2	.....	.....	.....	.....	
	12.10 to 1.40 P.M. (1½ hours).	.....	4 grms. pepsin 11.50 A.M.	103° to 100.8°	.....	79.12	6.12	.....	.....	.....	63.92	.....	9.38	.....	
	1.55 to 3.25 P.M. (1½ hours).	.....	.....	100.8° to 106.7°	.....	51.24	.....	21.96	.....	.....	97.54	24.34	.....	.....	
	3.45 to 5.02 P.M. (1½ hours).	.....	.....	106.7° to 105.3°	.....	82.35	9.15	.....	.....	.....	72.27	.....	0.93	.....	
32	9 to 11 A.M. (2 hours).	6½ pounds.	1 grm. pepsin 11.50 A.M.	103.4° to 102.4°	71.78	.....	.....	.....	.....	69.33	.....	.....	.....	.....	
	12.25 to 2.25 P.M. (2 hours).	.....	.....	102.4° to 105.4°	.....	70.2801	.....	1.50	.....	.....	77.57	8.24	.....	.....	
	2.50 to 4.50 P.M. (2 hours).	.....	.....	105.4° to 103.6°	.....	72.1693	1.389	.....	.....	.....	67.76	.....	1.57	.....	
33	12.40 to 1.40 P.M. (1 hour).	13 pounds.	4 grms. pepsin.	101.8° to 102.2°	73.2	.....	.....	.....	.....	77.1	.....	.....	.....	.....	
	2.35 to 4.35 (2 hours).	.....	.....	102.5° to 99.2°	.....	61	.....	12.2	.....	.....	45.92	.....	31.18	.....	
	5.05 to 7.20 P.M. (2.25 hours).	.....	2.10 P.M.	99.2° to 99.2°	.....	67.1	.....	6.1	.....	.....	67.1	.....	10.00	.....	Dog was very ill from first injection; died within 24 hours.
	7.35 to 8.50 P.M. (1.25 hours).	.....	.....	99.2° to 99.4°	.....	78.08	4.88	.....	.....	.....	77.92	0.82	.....	.....	
34	10.57 A.M. to 12.27 P.M. (2 hours).	.....	.....	101.6° to 101.2°	159.42	.....	.....	.....	.....	152.30	.....	.....	.....	.....	
	1.35 to 3.35 P.M. (2 hours).	35 pounds.	4 grms. pepsin.	101.2° to 105.4°	.....	115.9	.....	43.52	.....	.....	171.025	18.728	.....	.....	
	4.05 to 6.05 P.M. (2 hours).	.....	.....	105.4° to 103°	.....	122	.....	37.42	.....	.....	90.55	.....	61.75	.....	
	6.25 to 8.25 P.M. (2 hours).	.....	.....	103° to 101.8°	.....	87.84	.....	71.58	.....	.....	62.09	.....	90.21	.....	

decrease of heat dissipation; then, for an experiment lasting two hours,

$$t = 2\ (ip + dd).$$

because the hourly increment of temperature must be the gain of heat production plus the loss of heat dissipation. If it so happen that heat dissipation is increased instead of decreased, then such increase must be subtracted from the increase of heat production, and the formula becomes (id being taken as the symbol for increased dissipation) $t = 2\ (ip - id)$. If the temperature of an animal falls during an experiment, such fall can only be due to increase in dissipation, or lessening in heat production, or to a combination of these changes. Of course, bodily temperature might fall when there was an absolute increase of heat production, provided such increase was overcome by a greater increase of heat dissipation. Taking t' as fall of bodily temperature, dp as decreased heat production per hour, express the height of a curve of two hours, $t' = 2\ (dp + id)$ or $t' = 2\ (id - ip)$ or $t = 2\ (dp + dd)$.

In applying these equations to test the accompanying curves, it must be remembered that the equations are based upon the suppositions that immediately before the occurrence of the changes of temperature under consideration the heat production and heat dissipation were so balanced that the temperature of the body was at rest.

If, in any experiment, the bodily temperature was falling or rising before the change of temperature under discussion, then allowance must be made for such previous inequality.

In examining these curves, or the results as given in the tables, the most prominent fact, the one which naturally first attracts attention, is that there is no fixed relation between the temperature of the body and the rate either of heat production or heat dissipation, or, in other words, that fever may exist with a lessened heat production, and that the bodily temperature is decided by the relation between the two functions of heat production and heat dissipation.

In all of the experiments in which there was a decided fever, during the coming on of that fever—*i.e.*, in the earlier hours of the paroxysm—heat production was increased, whilst heat dissipation was lessened. Another point worthy of notice is that in Experiment 30 the injection of pepsin was followed by a persistent fall of temperature, which was produced by a conjoined decrease of heat production and increase of heat dissipation. This phenomenon shows most clearly the derangement of the relations of heat dissipation and heat production produced by pyrogenic agents, for in health decreased heat production provokes decreased heat dissipation, and *vice versa*.

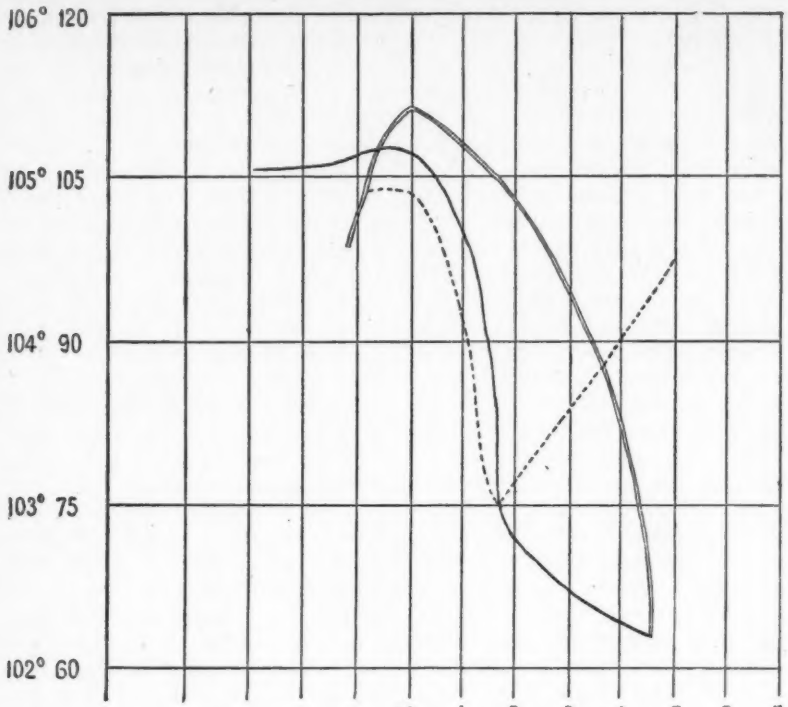
In Experiment 31 the access of fever was preceded by a decided fall of temperature, which fall was caused by an increase of heat dissipation and lessening of heat production.

There was a distinct defervescence in only three of these experiments. In Experiment 29 it was caused by an enormous fall in the rate of heat production. In Experiment 32 it was the result of a consentaneous increase of heat dissipation and decrease of heat production. In Experiment 34, as in Experiment 29, it was due to excessively decreased heat production. *

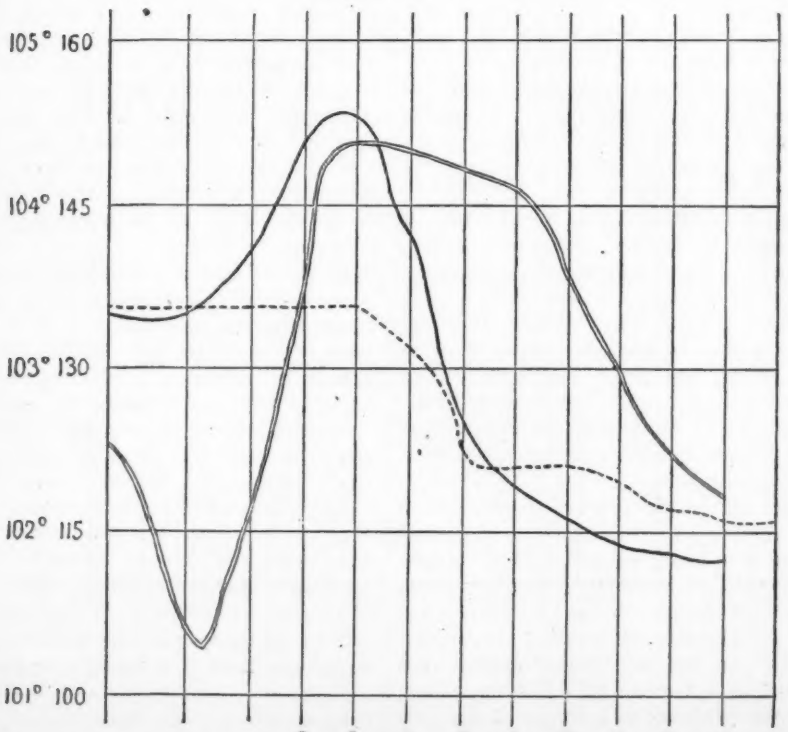
These experiments would seem to show that in the course of a febrile paroxysm of sudden acute fever preceded by a fall of temperature and lasting but a few hours, there is primarily an increase of heat dissipation and a lessening of heat production; that during the subsequent rise of temperature there is an increase of heat production and a decrease of heat dissipation until the maximum temperature or near it is reached, and then for a time these functions are variously performed, the relations between them being, however, such as to maintain the bodily temperature; and finally, that when sudden rapid defervescence occurs, it is usually chiefly due to a fall in the heat production, although sometimes heat dissipation is also increased. The curves of a typical acute paroxysm of fever would therefore be something like the following.

An examination of the various curves which we have given will, according to our thinking, demonstrate the correctness of the view that fever is of nervous origin. As fever is accompanied by increased production of animal heat, the pyrogenic agent of the pepsin solution could act in producing the fever only in one of three ways,—either by causing nutritive changes in the blood so rapid as to increase distinctly the production of animal heat, or by provoking similar chemical reactions in the solid tissues themselves through an influence exerted directly upon the tissues, or by affecting the nerve-centres, and thereby influencing the chemical movement of the tissues, either directly or through the medium of

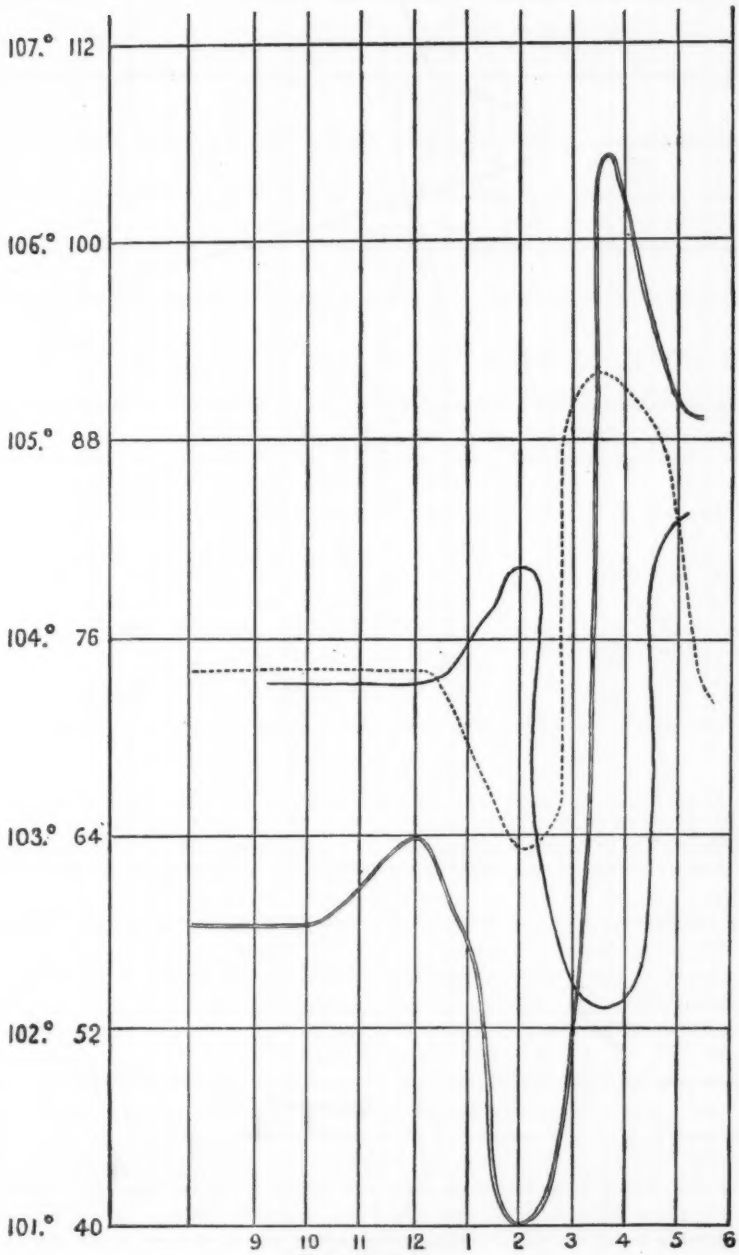
* The smallness of the figures involved is due to the very small size of the dog.



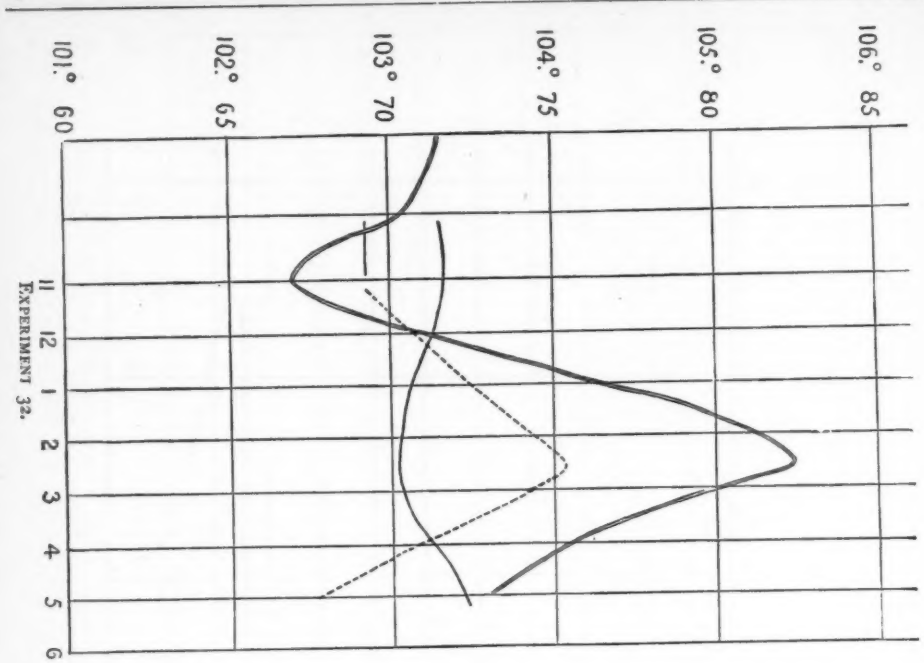
EXPERIMENT 29.



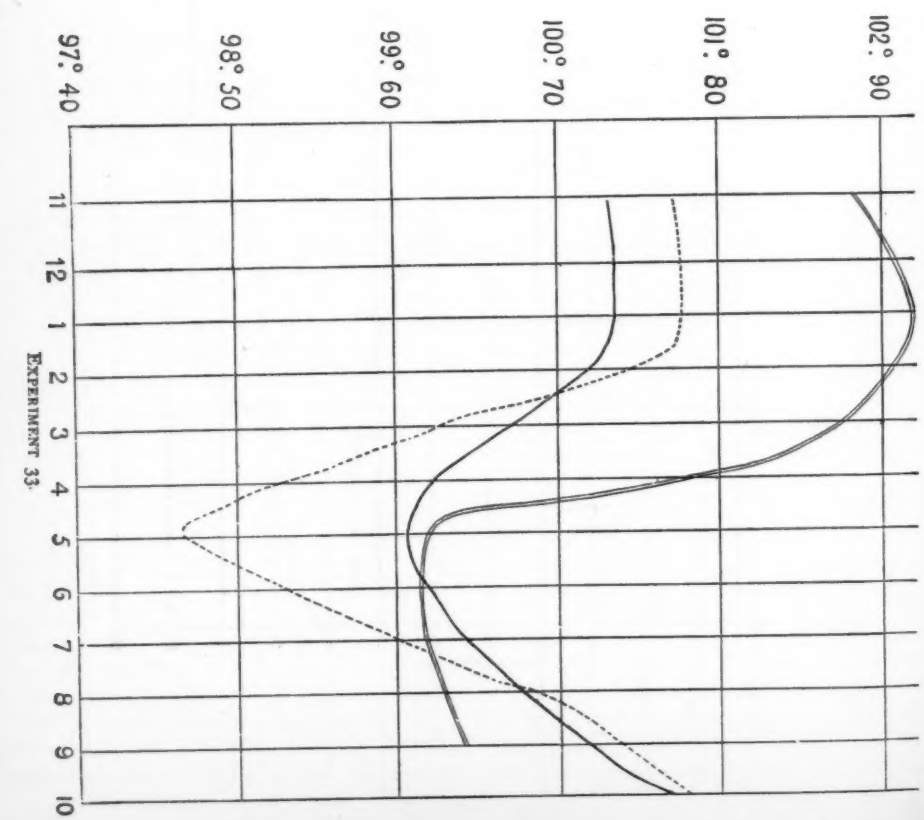
EXPERIMENT 30.



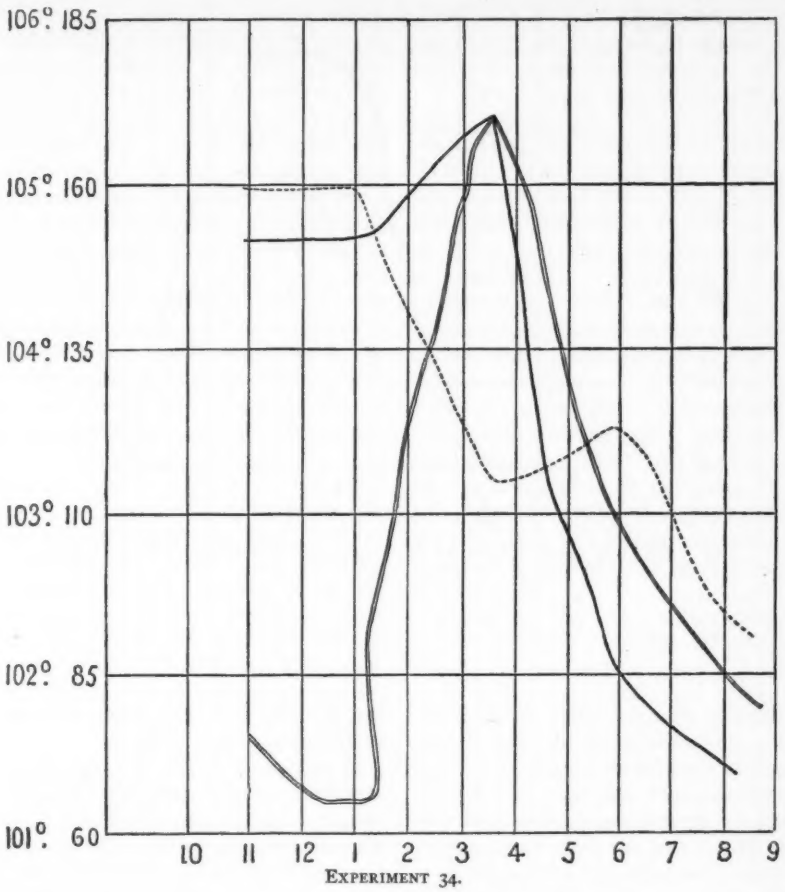
EXPERIMENT 31.



EXPERIMENT 32.

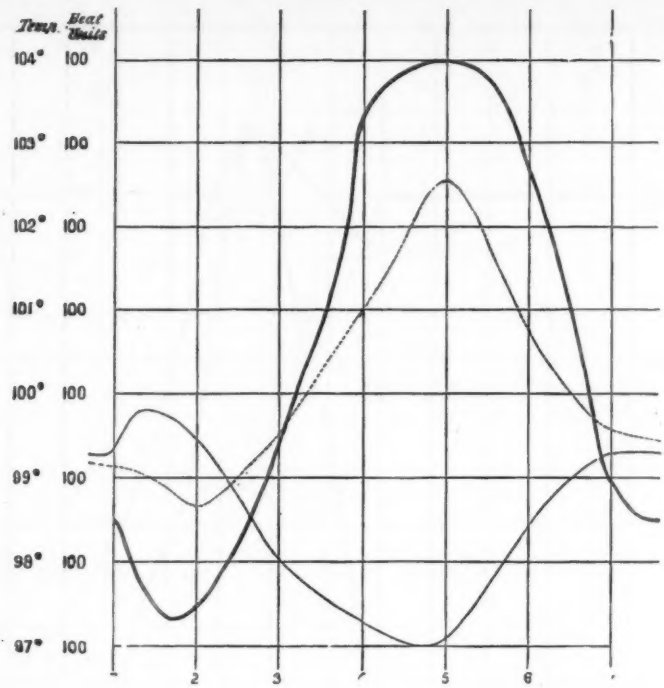


EXPERIMENT 33.



EXPERIMENT 34.

the circulation. The functions of heat production and heat dissipation in the normal organism are so closely related, one to the other, that any alteration of one is followed by a compensating alteration of the other. If heat dissipation be increased heat production is also increased to make good the loss, but if heat dissipation be decreased heat production is decreased; and, on the other hand, when heat production is increased heat dissipation is also increased, and *vice versa*. In this way the bodily temperature is in health maintained at a steady level. It is not conceivable that a substance which acts simply upon the blood, or the tissues directly, should, by virtue of such action, alter the normal relations between heat dissipation and heat production. Therefore, if by a direct action upon blood or upon the solid tissues an excess of heat production is caused, such excess should be accompanied by a rise of the dissipation of heat, and the elevation of temperature could only be produced by the increase of the heat dissipation not being able to keep pace with the increase of heat production. It will be seen, however, in looking at our curves, that the normal relations between heat dissipation and heat production are often reversed under the influence of the pepsin pyrogenic agent, so that, on the one hand, when in the beginning of the paroxysm heat production falls, heat dissipation is increased; and, on the other hand, during the height of the fever, the heat production rises, while the heat dissipation falls. This, we believe, proves that the fever is the result of a disturbance of the nervous system. Further, the various experiments which we have detailed prove that the fever is entirely independent of the arterial pressure, since normal arterial pressure may coexist with high or low temperature, and there is no corresponding rise or fall of arterial pressure with the variations of the temperature in the febrile state. If the increased



heat production were the result of the dilatation of the capillaries of the muscular system, where most of the heat of the body is believed to be produced, such dilatation would probably affect the general blood-pressure, and we therefore believe that our researches corroborate the theory reached in the work of Dr. H. C. Wood, that there are nerve-centres which are directly concerned in the thermogenic functions, and which affect the production of animal heat, independently of the circulation, by a direct action upon the tissues.

(To be continued.)

"PASTEURIZATION" FOR RABIES.

By G. Archie Stockwell, M.D., F.Z.S.,
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INSUSCEPTIBILITY to toxic and septic influences as a sequel to inoculation is by no means new either in theory or practice. Since was first derived from the Levant the knowledge that an inoculated *variola* limited the fatality and ravages of *smallpox*, the principle has been applied to a wide range of maladies with varying results. It has long been understood by pathologists that there are degrees of correlation among all septic poisons, but the attempt to define a common law therefor has not been attended with gratifying success.

More than a quarter of a century gone, De Humboldt, after a vast series of inoculations, imagined he had demonstrated a mutual prophylaxis existing between the venom of reptiles and the sepsis of that dread scourge of the tropics,—*el vomito*;* so, too, may be cited the more recent claims of Ferran, of Valencia, regarding cholera, or the assumed discoveries of De Freire, of Pernambuco, in yellow fever; all of which were better based, theoretically, and productive of far more brilliant results, than has ever accrued to the rabic researches of M. Louis Pasteur, and all of which also, under segregation and careful control investigation, have been disproved. The error appears to have been the common one of mistaking *coincidences* for *facts;* and no student in the physiological laboratory need be told that the law of coincidences is much more general in operation than has ever been surmised, and beyond all power of the human mind to grasp. Unfortunately for Pasteur also, his obstinate rejection of all forms of control experiment render his rabic labors wholly nugatory in the eyes of candid

* Proceedings of the Royal Academy of Medicine of Havana, Cuba, 1852.

and thinking scientists, and hence not a single pathologist or physiologist of note or established reputation is found giving adherence thereto! Apparently he is wholly ignorant of that most trite of scientific aphorisms: "*By the Negative alone is the real value of the Positive demonstrated!*" Again, his secret and empirical methods; his hasty assumptions and illogical conclusions; his arrogance and impatience of restraint or correction; and above all his neglect and disparagement of the labors of others while yet appropriating their results as original with himself,—all have tended to earn for him the enmity of the ablest scientists of Europe, and caused his utterances to be regarded with suspicion. Even the ablest of his own countrymen do not hesitate (and I believe unjustly) to accuse him of fostering evil to the most base of personal ends!

Diseases to which inoculatory prophylaxis is applicable are those only which have their inception in some foreign and extraneous organism that, by one accession, secures more or less immunity from subsequent invasions; and this organism, whether *bacterium*, *micrococcus*, or "degraded form of bioplasm," demands some knowledge of its characteristics, including physiology and natural history, ere practical and intelligent application can be made thereof. Whether the malady popularly known as *hydrophobia*,* but correctly speaking, *rabies*, possesses such organism, is a widely-mooted question: it has been the problem of centuries to the solution of which the ablest physiologists and scientists the world over have brought time, patience, energy, perseverance, and skill to bear in vain,—the "microbe theory" *yet awaits the discovery of the microbes.* The prevalent belief, however, is that the rabic virus does harbor a germ or organism that expends its force and energies in some mysterious and occult manner upon the central system to its derangement and exhaustion. Democritus, four hundred years prior to the Christian era, declared the "great nervous system" to be the seat of the malady, and from his time down to the present definite pathological changes in the brain and spinal cord have been sought in vain. Though discoveries have been heralded and claimed from time to time, none have withstood the test of calm, dispassionate, scientific inquiry; all have been conclusively proven spurious, imaginary, or no way specific of the disease. *There are no post-mortem evidences in either animal or human whereby a rabies may be positively defined!*

Pasteur's earlier announcements regarding rabies, though pertinaciously put forward and asseverated, differ very materially from later theories. They include the "Discovery of a specific microbe," "New evidences regarding the communicability of rabies by the blood," and "A *new theory* involving the central nervous system."† He angrily and acrimoniously repudiated convincing evidence brought by his colleagues to show that the microbe described was neither new nor specific. He revamped as original and new the ideas that have made the name of Hertwig famous among pathologists, at the same time appropriating those more recent of Raynaud and Lannelongue (members of the same Academy), and finally advanced as original a theory regarding the nerve-centres and rabies so ancient that Benjamin Rush speaks of it as "old" in *his* day.‡

Next§ we find him appropriating the exploded theory of Davaine that the general nervous system is the channel bearing the virus to its goal,—the great nerve-centres; for which the author thereof enters the lists against him, questioning alike his integrity and ability. At this time also Pasteur professedly obtained rabic virus "*in perfect purity in the brain*," with which he secured the rabic condition "*promptly and surely*" in the creatures inoculated therewith; yet a little later it is the "*spinal cord alone*," he asserts, that is the source of the poison.

Aside from the pathological objections to the foregoing and the contradictions, Pasteur himself furnishes the best evidence of its ridiculous character in that he declares many of the creatures so experimented upon "*recovered spontaneously*," while others "*recovered and relapsed*," which, it is hardly necessary to remark, is utterly impossible of true rabies, and disproved by such evidence as Hertwig, Eichborn, Marx, Schaller, Virchow, Bollinger, Bruckmuller, Bouley, Fleming, Galtier, and other much more able and candid investigators than he. Pasteur speaks definitely also of "*rage muet*," "*rage furieuse*," and "*rage dite*

* The word *ὑδροφοβια* was first employed by Celsus somewhere about A.D. 176 for the delineation of a *symptom*: hence its employment as specific of a *disease* is of questionable utility, and has been extremely provocative of error in the past.

† *Bulletin de l'Académie des Sciences* for January 18, 25, and May 31, 1881.

‡ Democritus (see preceding paragraph) is the earliest author of which we have any record who advances this claim.

§ *Académie des Sciences*, December 12, 1882.

spontanée"* (dumb, furious, and spontaneous rabies), in utter unconsciousness of the fact that the first two explain degrees of virulence without being specifically distinct, and that the latter is in no sense possible. *Rabies is positively never spontaneous*, but a result of direct infection,—that is to say, every rabid creature has been inoculated by another so infected, that in turn was bitten by a third, who, in like manner, derived the disease from a fourth, and so on!†

Soon‡ Pasteur formulates a new announcement: That rabic virus multiplies in the spinal cord, and that while one portion or section may contain it in abundance, another contiguous, perhaps intervening, may be wholly inert; a proposition so absurd on its very face as to require no comment. Then, that "while virus cannot be attenuated by culture, it may be weakened by employing different species and forms of life,—*i.e.*, it attains a descending degree of virulence by the inoculating of one species from another," and "virus thus attenuated, *if applied to the same species, remains so attenuated*, direct inoculation rendering the animal proof against subsequent infection." This is the doctrine of "fixity of virus" of which so much has been said and written; yet in the same communication he makes the perplexing assertion, "By performing inoculations in series and making transfers from one animal to another, the virus is *not* attenuated; but, on the contrary, *attains a very powerful degree of activity*." And again, a little farther on, by a series of inoculations upon rabbits he is enabled to "*increase the strength of the virus to any desired degree;*" and by inoculations of monkeys (which, strange to say, *for a biologist*, he employs in lieu of human beings under the mistaken supposition that like physical conformation begets like physiological conditions) he secures virus "limited in virulence, *further attenuated* by transfer to rabbits." Three months later§ comes the assertion that he could now render dogs "*refractaire*" to rabies "in as large numbers as any one could wish," and yet, to this hour, it has been impossible to find one canine so rendered refractory or insusceptible, or any record of such, outside of the laboratory of the École Normale; and he now admits that *twenty-five per cent.* of his experiments have been failures. In all candor I ask, What value can attach to such statements as these, published in *La Nature*, and uttered before the Académie des Sciences? Is this the testimony of an expert scientist, or is it of any more value because Pasteur utters it?

Next we have the claim of the molecular origin of virus, whereby Pasteur asserts his ability to determine a rabic from a non-rabic brain "with certainty," merely by the presence of "certain infinitesimal granules;" and when it was pointed out that his infinitesimal molecular granules were the *microzymes* of M. Bechamp, and common to all brains both in health and disease, he still adheres to the statement while admitting the fact, asserting there is a difference which *he* is able to detect but cannot explain. And later, in the face of the evidence and his own admissions, he pointedly asserts the molecular granules to be veritable *contagii vivi*.

In the final announcements,‖ those which embraced the much-heralded "*Method*," Pasteur unequivocally asserts his ability to prevent rabies *at any time prior to its first acute symptom*, "*even though years may have elapsed since the bite;*" and about this time he says, through *Figaro*: "*Any one bitten by a mad dog has only to present himself at the laboratory École Normale, and by inoculation I will make him wholly insusceptible to rabies even if subsequently bitten by a number of rabid dogs;*" and later, in the same publication: "*Whoever is bitten by a rabid dog has only to submit to my three little inoculations, and behold! he need not have the slightest fear of hydrophobia!*" After all this, however, upon the death of his first patient that presumably *was* bitten by a rabid animal, he shortens the unlimited period to *thirty-five days*, thereby placing the patient beyond the pale by *one day;* and a little later, without any explanation, to *fifteen days*. This patient only a few days before death was pronounced virtually cured, but with the unfortunate termination he suddenly veered about, and claimed it was received only through charitable consideration, knowing full well the result that must ensue!

The method is explained as the hypodermic injection of rabic spinal cord desiccated in veal-broth, the value of the inoculation being in *inverse ratio to the quantity, but not of its quality;* and that "*the strength of the cord must be such that it does not endanger the life of the subject*," . . . *yet is* "*more virulent than the virus of street dogs*." This may be considered a perspicuous style of composition at

* Yet Pasteur claims to have disproved and set at rest the theory of *spontaneous generation!*

† Ibid.

‡ February, 1884.

§ May, 1884.

‖ October and December, 1885.

the École Normale, but for my part I must confess to finding it uncommonly cloudy, and about as definite as the subsequent information that he is unable to explain how the strength of the cord used is determined, further than he "*knows by experience and looking at it.*"

The case of Joseph Meister, which is perpetually cited as evidence of the "*Method*," demands some consideration. If the whole history is considered and weighed, the evidence is wholly of a doubtful or negative character. The boy, a child of nine years, was bitten July 4, 1885, in thirteen (some say fourteen) places, and *the wounds immediately cauterized.* The offending canine was also promptly killed, and the autopsy discovered hay, straw, and other extraneous articles in the stomach, whereupon the creature was pronounced rabic. Two assistants of M. Pasteur, to wit, Messrs. Vulpian and Grancher, decided also that the little lad was "undoubtedly doomed to rabies," because of "the number and severity of the bites!" The question is, whether this case has not done Pasteur material harm. It certainly has wrought him the enmity of eminent scientists and pathologists, who accuse him of "making capital" with dishonest motives, since every physician and veterinarian knows, or should know, that the stomachs of the *canidæ* are almost never without foreign bodies,* frequently exhibiting a general and miscellaneous assortment, induced as supposed by the presence of intestinal parasites (from which no dog is ever wholly free), or irritating materials (bones, earth, etc.) incidentally swallowed with food. The contents of the canine stomach are in no way pathognomonic of any malady; and foreign substances therein especially obtain during digestive and intestinal disturbances, or other derangements of the *primæ viæ.*

It will be observed, also, that the prompt cauterization of young Meister's wounds is altogether ignored; yet Youatt assures us that by caustics alone he preserved more than four hundred people from the horrors of rabies, and *himself* on *seven* several occasions. Again, from Pasteur's stand-point there is apparently no limit to the period of rabic incubation, and therefore abundant opportunity remains for the disease to yet manifest itself.†

In reviewing the mechanical evidences of Pasteur's work, I avail myself of the labors of one who has given the subject of Pasteurization no slight attention. Says Dr. Charles W. Dulles,‡ in an essay read before the Philadelphia County Medical Society:

"As usual Pasteur speaks in his last communication as being '*always successful*;'§ again, his experiments have been '*innumerable, so to speak*,' . . . drawing conclusions that could only rest upon an uninterrupted series of experiments, each complete and successful throughout. Having taken the trouble to figure out what *one* such series represents, I find it means: No interruption, and no failure in experiments demanding *from one hundred and thirty to one hundred and forty rabbits, and a period of from two and a half to three years!* An interruption anywhere would condemn the whole series. Supposing, then, no interruption occurred, *how many such series could Pasteur have carried on since the time he says he began them?*

* Dr. Spitzka, of New York, justly celebrated as a pathologist and neurologist, declares that of more than forty canine vivisections in the laboratory of Prof. Henry Draper, in not a single subject was the stomach found without foreign bodies, such as *spools, strings, coals, ashes, hay, straw, tops, leather, rags, buttons*, etc. That this is the invariable rule, I can further corroborate from personal experience in numerous canine autopsies and dissections.

† Under the head of Paris correspondence, and date of January 15, 1886, is found in the *British Medical Journal* an account of a case by Dujardin-Beaumetz. The patient had been bitten in the hand more than a year before (in 1884) by a dog that, though it gave no evidence of rabies, was immediately killed. Some slight pain occurring in the vicinity of the wound, and excited by the expressed fear of friends, the man applied to Pasteur, who as usual made a theatrical declamation: "*I can preserve, but I do not cure!*" said the *savant* of the École Normale; and the poor fellow subsequently expired in horrible agony! If a rabies can be contracted two years after the wound is inflicted, what value have the assumed cures of Pasteur as evidence!

The theory whereby rabic virus is supposed to remain latent in the vicinity of the wound for considerable periods, varying from a few days to as many months or years, is a superstition of more than *twenty centuries'* standing, and it is surprising that enlightened and intelligent individuals, especially members of the medical profession, should yet be found giving credence and adherence thereto. Such presupposes a stasis of capillary circulation without any of the consequences that accrue to such results, and therefore involves physiological and pathological impossibilities. The truth is, there is no possible or known septic or toxic poison, whose effect is the result of direct contact with the circulatory system, that requires even half a dozen weeks for development; in that time, if it has not manifested itself, it has been eliminated, and subsequent effect is due to other and coincidental causes.

‡ *N. Y. Medical Record*, February 13, 1886.

§ Pasteur ever ignores the law or possibility of coincidence, as well as all form of control experiment (negative evidence): this is conspicuous everywhere throughout all his utterances regarding rabies.

"Again, what seems a most fatal objection to the trustworthiness of these experiments is Pasteur's own admission that a full half of the spinal cords used in the crucial test upon Joseph Meister proved to have no virus at all when tested on rabbits! If this could happen in the *only* detailed experiment that he has ever recorded, what are we to believe of the experiments carried on in the secrecy of his own laboratory, of which no record has ever been given, and of which not a single witness has ever spoken?

"Another matter to be remarked is, that until recently Pasteur has given no hint that the virus of rabies could be attenuated so simply as by desiccation of the spinal cord; and yet, if his own statements are to be accepted, he must have been far advanced in his experience with this method at the time he was startling the world with his backward and forward modifications of the virus by means of monkeys and rabbits, and presenting that as the *only* way of procuring material for inoculations.

"If we take the trouble to place side by side Pasteur's statements at different times, it is found that they are so inconsistent that the cordial acceptance of any one of them demands that those preceding be wholly banished from memory. At first it was in the brain that the virus was to be obtained; then trephining and intradural inoculation was the sovereign method; then intravenous inoculation simplified the matter; then blood was a good virus (though this had been previously denied by him in his second communication to the *Académie*); then smaller quantities procured the fiercer rabies; then inoculations in series modified the virus after many variations; then a few monkeys and rabbits did the work; and, to crown all, ignoring the evidences of his own work in regard to *charbon* and *chicken-cholera*, he declares that the protective character of the virus depends upon a reduction of *quantity*, but *not in the virulence of the material* used! And when we catch our breath, we cannot but recall what has gone before and ask, *If the hypodermic use of graduated virus was the means Pasteur found most readily produced the most furious form of rabies in February, 1884, when he must have been half-way through the series of experiments upon which his final communication is made, how could the remaining half have sufficed to prove the same procedure would exert a kind and protecting influence on the same animal and in man!*

"Also, Pasteur actually intimates that the virus of rabies may be formed of two distinct substances,* and that by the side of the one which is animate and capable of germinating in the nervous system there may be another inanimate, having the power, when in proper proportions, to arrest the development in the former!"

The latest announcement of the French *savant* is that his inoculations "have proved *successful*" in some sixteen hundred and fifty cases,—cases which include Joseph Meister, the four Newark children,—Kaufmann, Salter, Bucklin, Miss Morosini,—Metlzer, and all who *were not* bitten by rabid dogs,† to say nothing of some scores of healthy people who underwent the operation from curiosity or to secure the immunity it is supposed to insure. From the remaining number must be deducted *ninety-five per cent.*‡ for those bitten by rabid creatures who would in any event escape all manifestations of the disease. From the balance further subtract those in whom the disease has not yet had time to develop (accepting Pasteur's estimate thereof).

With such essential depletions, even ignoring the last, the figures assume such insignificant proportions as to be practically without value. To be sure, Pasteur has recently claimed, or others have claimed for him, that

* This is subsequently affirmed most positively by Dr. A. Cartaz in *La Nature* on the strength of Pasteur's own assertions; also by M. Vignal, another mouth-piece of the École Normale.

† Few of the cases whose positive history can be traced afford so favorable evidence as even that of Joseph Meister. The dogs that wounded the Newark children are still alive and well, having been quarantined for observation, and two of the children who did not visit Pasteur fared equally as well as those that did. Kauffmann and Bucklin were not even bitten, but had some portion of their bodies caressed by the tongue of canines that gave no evidences of *any* disease; and the evidence in Miss Morosini's case rests solely upon one little feather found within the stomach of her pet.

‡ The proportion of dogs—much less human beings—that are infected by the bite of rabic creatures is extremely small. Nine different attempts to procure the disease in the famous poodle of Hertwig failed. Dogs experimentally bitten from three to sixteen times each, at veterinary schools in Germany and throughout Europe, suffered not the slightest inconvenience therefrom; and individual cases with greater ratios are common. Grove admits that but one dog out of every *twenty* bitten by other and *known* rabic dogs ever contracts "canine madness." John Hunter says, one of *twenty-one;* Hamilton, one in *twenty-five;* Nieumann, one of *thirty-five;* and Fabrè's extended researches revealed but a total of thirty-one out of eight hundred and ninety-two cases, —*less than four per cent.* Statistics embodying larger figures on close scrutiny are found to make no distinction between specific or true rabies and a simple neurosis inducing a spurious rabies.

no inoculation is ever undertaken until a certificate is presented that the person has been bitten by a rabid dog; but this, of personal knowledge, I know to be untrue.* Again, since there are positively no evidences either in the life or death of a canine whereby a rabies may be with certainty determined, even by the most profound veterinarian and physiologist, of what value is such certificate?

Twenty-one deaths have followed Pasteur's ministrations, in spite of the boasted success of the "*method*," all of which, with the exception of the Pellitier child, came within the *fifteen-day limit*, and for a majority of which the lame explanations were offered that different species of *canidæ* induced different degrees of virulence, or that they were "*bitten near the brain.*" This latter supposition, that the point of inoculation has direct reference to the period of incubation, is another theory borrowed from Davaine, and long since repudiated by the latter; moreover, it has been repeatedly disproved, even so recently as April, 1884, by Dujardin-Beaumetz in a communication to the very Academy of which Pasteur is a member, embodying a synopsis of thirty-four cases occurring within the Department of the Seine!

Within the last hundred days no less than *six cases* are reported as having succumbed to rabies, all of which had been under Pasteur's hands and pronounced by him "*cured.*" On the 27th of April a young girl from the Jura was bitten, and reached the laboratory of the École Normale nine days later. At the end of fifteen days she was discharged with the assurance all danger had been averted; yet on the forty-third day following the first inoculation she died of rabies. Also, the *Journal de Médecine de Paris* in July reported that a Russian woman had just died of rabies at her own home in St. Petersburg, whither she had returned after undergoing Pasteur's inoculations, and assured by him she was "*completely cured.*" On the 21st of July a man bitten by a rabid cat died at Grenoble who had undergone the preventive treatment of the "*Method*" from May 4 to May 13. Of seven persons bitten by a mad dog (not wolf this time) sent from Russia, and all treated by Pasteur, three succumbed to this fatal malady shortly after their return home. And yet Pasteur continues to announce the certainty (*surement*) of his "*Method*," and, what is more, secures converts!

True rabies presents multiple and varied phenomena, without a single constant feature, and hence its presence is with difficulty determined even by the most expert. Indeed, so erratic are its progressions and manifestations, that it is a greatly-mooted question whether it exists as a malady *sui generis*.† More than sixty diseases in man, and double the number in the dog, are constantly being mistaken for rabies by the most expert members of the medical (general and veterinary) professions. The former include disorders of the stomach, especially in very young children, as well as inflammation of the stomach and œsophagus in adults; disorders of the respiratory apparatus;‡ disorders of the circulatory apparatus;§ systemic conditions, including rheumatic fever, gout,‖ *uræmia*, pernicious *an-*

* M. Wm. Vignal writes (in *N. Y. Medical Abstract* for May, 1886): "Although Pasteur asks for a certificate, yet when one is not forthcoming and there is reason to believe the dog is mad, he inoculates!"

† Wounds, even though made by one of the carnivora (*canidæ*), are in no sense presumptive of rabies; even the vast majority of rabic cases are, undoubtedly, the sequel of functional disturbances of nerve-centres as the result (*a*) of simple *septicæmias*, and (*b*) the fears and imaginations of the individuals, their friends and advisers. When we consider the influences of fear, anxiety, joy, and anger upon the great nerve-centres, remembering that these are capable of so modifying any and all the secretions of the economy, even to the milk within the maternal breast, or the saliva, until toxic properties are developed; that persons have died within a few moments, or hours, from these and kindred causes; that individuals in robust health thereby are permanently invalided, rendered insane, thrown into convulsions and catalepsies, and driven to *felo-de-se*: we understand how cases of so-called *hydrophobia* may, *and do*, arise, especially if by any stretch of the imagination the animal can be linked therewith. No physician or neurologist, however able, expert, or talented, has ever been permitted to fathom the mysterious workings of the nervous centres under profound agitation of the mind, or to discover what influence the perturbed mind may have reflexly upon the nervous system, or through it upon morbific agencies that may already have been implanted within the economy. *And this is even more true of the canine than the human subject.* Wounds made by *carnivora* (flesh-eaters) are always prone to develop septicæmia in any form of life, by reason of putrid and decaying particles that may be retained in and about the teeth and mouth.

‡ See Transactions of the Medical Society of the State of Pennsylvania for 1884. The resemblance in many of their symptoms of diseases of the respiratory tract to rabies is so marked that Aromatarius, in 1625, devoted a monograph to proving rabies was but a *contagious sore throat*.

§ That inflammatory conditions of the heart and its envelopes (*pericarditis, endocarditis*, etc.) do frequently give rise to conditions that are mistaken for genuine manifestations of rabies, is a fact well recognized in most treatises and monographs upon the subject.

‖ H. Sutton.

æmia, intermittent fever, typhus, mercurialization,* pregnancy,† bronchocele, poisoning by iodo-hydrargyrate of potassium,* deuto-iodide of mercury,* digitalis, and various toxic plants; disorders of the nervous system,—meningitis, pachymeningitis, tumors, abscesses, and parasites of the brain, simple neuritis, acute mania, spinal sclerosis, acute delirium,‡ alcoholism, tetanus, epilepsy, hysteria, and the use and abuse of chloral, chloroform, ethyl bromide, hyoscyamus, cocaine, betel, etc. In the animal, also, we find the following: "toothache," "earache," canker (mastoid disease), abscesses, *enteritis*, *gastritis*, *gastro-enteritis*, *ileus*, *peritonitis*, *nephritis*, *cellulitis*, *cystitis*, intestinal obstruction and perforation, rheumatisms, heart, throat, and lung difficulties, epizootics and distempers, parasites in throat, nasal cavity (*pentastomæ* and *æstrii*), kidneys, heart, intestines, liver, brain, muscles, etc.; skin-diseases (*mange*); diseases of the eye; "sea-sickness"; "land-sickness" (following long voyages); ague, fevers, *chorea*, epilepsy, epileptiform spasms, spasms of reflex origin; pure psychoses (*mania* and *melancholia*); *anæmia*, *uræmia*, *pyæmia*, *septicæmia;* metallic and corrosive poisons (copper, arsenic, benzoic acids, mercury, etc.); *hydrocephalus*, *meningitis*, *encephalitis;* and in fact the whole class of nervous and mental diseases to which canines are subject in *even greater degree than man*, and whose existence has not even been suspected by a majority of observers. Personally, after more than twenty years' experience as physician, dog-owner, dog-breeder, and student of canine and comparative medicine and physiology, I have yet to meet with an *absolute* case of rabies in the dog; and of some scores of so-called hydrophobic animals, alive and dead, presented for my inspection, one and all were found to have suffered from other and innocuous maladies.§

Unfortunately, the testimony of Pasteur as to what constitutes rabies, owing to his total lack of medical education and training,‖ is valueless. It is something more than strange that the dictum of such a visionary should be received so implicitly, while the evidence of a Huxley, Owen, Haeckel, or other eminent biologist possessed of sound physiological education upon this particular subject, would pass almost unheeded save as corroborated from other sources; and that, too, in the face of the fact that he (Pasteur) exhibits a total lack of familiarity with the history of the disease, past and present, and formulates as specific manifestations trains of symptoms that are common to scores of simple maladies, and in no sense pathognomonic of any one.¶ Every physiologist or pathologist knows that intradural inoculation,—the means employed by Pasteur to secure "infected" (?) spinal cords,

* Dr. Reid, in 1817, mentions a young woman who died as a sequel to profound mercurialization induced with a view to relieving a tertiary syphilis. I am personally familiar with a like case induced by the combination of mercury biniodide and iodide of potassium. The immediate cause of death in both cases was really ulcerative stomatitis.

† Doleris and Mazars de Cazelles mention "*hydrophobia*" as occurring as a sequel to pregnancy; the latter says *eleven times* in the same individual.

‡ Westphal, in *Archives für Psychiatrie*, II., says that acute delirium is often confounded with rabies, and that in "*depressed and hypochondriacal subjects the bite of a healthy dog will cause hydrophobia.*"

§ Three skulls recently came into my possession, by favor of a skilled member of the veterinary profession, of dogs slain as infected with "hydrophobia," and yet all suffered no other malady than the so-called "canker," *otitis cellulosa*, or mastoid disease.

‖ In the face of the evidence so frequently offered, there are those who persist in believing M. Pasteur an epitome of biological, medical, physiological, pathological, and chemical attainments. To such I will not offer evidence personally derived, but recommend the perusal of the volume entitled "Pasteur: his Life and Labors," as edited by his *son-in-law* and revised by *himself!* For the benefit of such as may not encounter this most extraordinary work, I quote a few paragraphs from an article by Dr. Frank S. Billings, an intimate and ardent supporter and admirer of the man, as found in the April (1886) number of the *Journal of Comparative Medicine and Surgery:* "Pasteur is no chemist, . . . he is not even a physiological chemist, nor has he any professional knowledge of the fundamental branches of medicine: and last, but most of all, we fail entirely in perceiving any evidence of broad education in biology, zoology, and philosophy, which is absolutely necessary to a man having comprehensive views in science. . . . Pasteur did not approach any of them (anthrax, chicken-cholera, the swine-plague, and rabies) as a pathologist; . . . he had no interest in these diseases, *as such*. He did not care an iota about their nature other than their contagiousness; and so far as the nature of the pathological changes occurring in them, they had no interest for him at all. To Pasteur they were simply a given something; in the tissues of these animals there is lodged a specific quantity, this quantity the contagious or infecting principle. The next thing was, what can be done with this principle? Pasteur is no bacteriologist; not one of his statements as to the existence of a specific form in a given disease are to be trusted unless we can find collateral support for them in the works of others. . . . In fact, unlike such men as Darwin or Virchow, Pasteur is not a man of ideas, not a deep thinker; he will never move the world as a great teacher, but simply as a contributor of new evidence; . . . he ignores the work of others, and to my mind the reason for this is that it is largely medical, and hence, knowing nothing of it, it would be of little use to him."

¶ See page 680.

—even of the simplest septic or aseptic product, is almost invariably attended with consequences most grave to the creature so operated upon. Naturally, paralysis most frequently follows, yet it is the evidences of paralysis upon which Pasteur so confidently relies for his diagnosis of rabies. If an opening be made in the cranium of the dog, or the rabbit,* directly over the nerve-centres, —and the nervous system of either is much more impressible than that of man,—and a drop of pus, blood, or *bouillon* introduced in the submeningeal space, the miracle would be if the creature *did not* speedily develop a paralysis of facial muscles and posterior extremities!† M. Paul Bouillier, a distinguished veterinarian and a member of the Parisian Council, declares—and there is no individual in better position to *know*—that Pasteur's inoculations have not the slightest preventive or mitigating influence upon rabies, either in the canine or human subject; that the animals that provide the so-called virus are not rabic, but sufferers from simple cerebral and meningeal affections artificially induced; that the persons supposed to have been cured by the "*Method*" were never affected by true rabic virus,—either the creatures that produced the wounds were innoxious, or the virus individually was inoperative; and finally, after having given the matter his personal attention, arriving at the foregoing conclusions, he challenged M. Pasteur to personal test,—each to be bitten by a *known* rabic animal. M. Bouillier to be cauterized, and M. Pasteur to rely upon his inoculations.

Complete paralysis as the sequel of submeningeal inoculation constitutes the "dumb rabies" (*rage muet*) of M. Pasteur, while a less diffuse form of intradural inflammation, provoking delirum, either with or without subsequent palsy, becomes a "*rage furieuse*" (furious rabies). This accounts also in some measure for the assertion that the latter is induced by employing minute quantities of virus, the larger proportion procuring *rage muet*, which he mistakenly supposes to be the least specific and virulent form of disease: an error that would scarce be perpetrated by a pathologist. I now recall four comparatively recent cases whereby death was induced in the human adult from intracranial (cerebral) abscess, and in not one of which a drachm of pus was found on autopsical examination. One yielded only about one-third the quantity; and yet paralysis was present, along with other symptoms that, measured by the Pasteurian standard, would have made a diagnosis other than rabies a criminal error!

Fairly familiar with the man, and his methods and abilities, I have no desire to question Pasteur's primary integrity or original purity of purpose. On the contrary, I would accord him every honor that is his due. I regret that his efforts regarding rabies have not some definite basis, and that they are not more deserving of support. Unfortunately, he has been led into error,—the error of ignorance of his subject,—while the constant empirical promulgation of his peculiar ideas retards the wheels of progress, whereby science is made to suffer. I must admit it is difficult to criticise the man fairly or justly, since his work for the most part consists of mere assertion. Again, no one can follow his work. Apparently he cannot follow it himself. Take any one of his utterances, and one is amazed to find a contradictory mass of statements, such as have never emanated from any other source. We discover no well-arranged, systematic records of study and experiment, along with data, facts, and conclusions carefully considered and worked out,—the usual evidences of the efforts of the true scientist; but we find positive assertions to-day as positively controverted to-morrow, both overwhelmed and denied on the third occasion. Judged by any standard, it is impossible to accord him rank as a scientist, and yet carefully considering his real and brilliant discoveries, he deserves high place in general estimation. Both visionary and erratic, without any consideration of cause and effect save as desired, demanded, and expected, he hails with delight all evidences that may present themselves as positives, while wholly ignoring the negatives: for the time being he is the man of a single idea, and all things, therefore, must accommodate themselves and become subservient to that idea. Those who persistently follow one train of thought with the one end in view to the exclusion of everything else, are sure

* It is a well-known fact that the *leporidæ* (rabbits and hares), though suffering from rabies, exhibit no evidences of specificity. How, then, does Pasteur definitely decide whether he succeeds in producing the disease in this order of animals is an interesting subject of query.

† See account of six experiments made by Dr. E. C. Spitzka, wherein the brains of as many dogs were inoculated with normal spinal cord of a calf, with emulsion of pons and cerebellum from a patient who had succumbed to specific rabies, with yellow soap, and stale or putrid urine of horses, as communicated to (and animals exhibited before) the Society of Medical Jurisprudence and State Medicine.—*Journal of Comparative Medicine and Surgery*, July, 1886.

to discover evidences that to their own mental vision are incontrovertible. An hour's conversation with Pasteur is convincing evidence that he must be included in this category. Add, too, a hasty temper, overweening confidence and egotism, impatience of slow experiment and inability to await definite results, dread of being forestalled and supplanted in public favor, and then, and then only, can a true estimate of the man be had. Even Napoleon had not a more exalted idea of "*destiny*." Such characteristics cannot but tend to the formulation of crude and ill-drawn conclusions as facts, trusting to the varied chapters of accidents to sustain them in the future as they have done in the past. Nevertheless, even such genius as may be granted Pasteur does not foster confidence in his assertions or abilities. What we know of ferments, of anthrax,* chicken-cholera, vine and silk-worm disease, is in great measure due, directly or indirectly, to his labors; but since his unqualified and positive promulgation of the rabic theory, and the flat failure of the swine-cholera† prophylaxis, his assertions will scarce meet the cordial approbation of candid scientists until corroborated from other and more able sources. Indeed, his assertions have never been received at home with the cordiality and reverence with which they are popularly accredited in the United States,—error derived from idle, irresponsible communications to the medical and general press; and, save as the name of M. Roux, or M. Wasserzug, is associated therewith, little heed is given thereto. One of his greatest inconsistencies, the one which has done more to promote suspicion and distrust in thinking and observant minds, is his oft-repeated assertion that the "*Method*" is "*sure, simple, safe*, and *practicable*." Yet at the same time he positively avers that, outside of his laboratory, "there is not a single individual capable of undertaking the treatment with *surement*." Another is, "Inoculating a quantity of virus insufficient to produce the symptoms of canine madness (*phenomènes rabiques*) *does not* confer immunity,—that is, the remedy must needs be more virulent, and consequently more dangerous than the virus that obtains the disease,—"more virulent than (the bite of) street dogs!"

It must be remembered that Pasteur has wholly abandoned the saliva as a natural virus,—the only factor known to positively communicate the malady,—substituting instead emulsions or macerations of spinal cord.‡ That the latter are capable of inducing simple septic inflammation does not admit of a doubt; and it is this sepsis that, without either evidence or experience, he so unhesitatingly and arbitrarily pronounces "rabies." If his experiments prove anything, it is only that these inoculations, under certain conditions, may render different forms of animal life "*refractaire*" to the condition the virus itself induces; and here is embodied one of the very principles at which we have been accustomed to sneer when advanced by our brethren of the strict and ultra-homœopathic persuasion.

In lieu of other evidence, to witness the inoculations as publicly performed at the laboratory École Normale alone would be sufficient to excite grave doubts of their utility, providing one can resist the personal magnetism of Pasteur sufficiently long for correct observation. Daily some half hundred or more people crowd the operating-room, and without any rule of procedure or preference walk about a table upon which is placed the array of glasses that we are told contain virus in *bouillon* in varying degrees of culture and virulence. No reference to case-book or register is ever made, even if such be kept; but M. Grancher inoculates (for Pasteur, who is disqualified by lack of medical education under French law) in a grossly unscientific, not to say slipshod, manner. It is impossible he should know who is who, since he rarely lifts his eyes to identify the subject, and he receives the syringe already *filled*, often before

* Already comes the news from France that the preventive method for charbon is unsatisfactory. How far this is truth or due merely to rumor I have no means of knowing at present.

† See Department of Agriculture Reports of the past four years; also Report of the State Veterinarian of Nebraska, and his utterances in the *American Veterinary Review* for the current year.

‡ Galtier, of Lyons, a much more able, thorough, and candid experimenter than Pasteur, would seem to have set this matter at rest by collecting and verifying the experiences of others in connection with his own work. By a number of series of experiments, secured further by careful control evidence, he has demonstrated the fact that the *materies morbi* of rabies is confined to the saliva of the true carnivora alone, that inoculation with blood, portions of salivary and parotid glands, portions of the contents of stomach, of brain and spinal cord, or their fluids, all lead to no infection. He further cultivated virus obtained from the *canidæ* in normal saliva, and vaccinated guinea-pigs and rabbits that died in from four to twelve days; but in retro-vaccination of dogs by means of the salivary products of these creatures, he was unable to secure a rabies in a single instance. N.B.—*No non-carnivorous creature can communicate a rabies!*

it is known who the patient will be, from the hand of a servitor, and empties it into the right or left abdominal space, as the case may be, without question or inquiry!

The results of the "*Method*" are easily summed up: Twenty-one deaths, with no pertinent or satisfactory explanation; some hundreds of people to bear witness that it is productive of no immediate harm; as many more to illustrate the well-understood advantage of fears allayed; in all no more than has accrued to *aristolochia indica, simaba cedron, inula, xanthium spinosum, planta genista*, applications of human fæces, Sanjoie pill, "the false tongue of the colt," "mad-stones," and other nostrums innumerable. *Per contra:* It has induced and fostered a widely-spread irrational epidemic of *lyssaphobia*, or *rabiphobia* if you prefer; catered to an irresponsible and sensational press; promoted the sale of nostrums and encouraged vile quackery; is responsible for numberless suicides, deaths from spurious rabies, and at least one *murder most foul*;* and brought about a heartless and cruel persecution of innumerable and inoffensive canines!

The science of the present era is nothing if not progressive, but it demands *truths*, not mere vague theories and unsupported inferences. Superstition is the refuge only of the timid and inconsequent; and to the superstitions of twenty-two centuries and more Pasteurism owes its rise; superstitions from which the medical profession, alas! is none too free, and that inculcates insane fears that lead to grasping at straws. There are no parallels between its teachings and those of Jenner, to which it has so often been compared, since the latter was derived from fixed pathological data, entirely lacking to the former, which rests solely upon the unsupported and self-contradictory assertions of its author. Neither is the opposition to Pasteur the outcome of bigotry, intolerance, conservatism, or jealousy, as many are led and willing to believe, but merely a demand for hard, stern facts, stripped from all jugglery and superstition,—a demand of science that an intangible theory be made tangible, and reconciled to existing and firmly established physiological and pathological laws which it controverts. *Verborum sat!*

* (Associated Press despatches.) "Cohoes, N. Y., February 3, 1886.—Sunday night George Waterhouse . . . showed signs of hydrophobia. He grew rapidly worse. . . . The physicians saw there was no hope of saving him, and to end his sufferings ordered *that he be smothered*, which was done. Waterhouse was bitten by a dog *six years ago*, while a resident of Lansingburg!"

SEPULTURE VERSUS CREMATION.

By George Hay, M.D., Pittsburg, Pa.

EPISTLE to the Hebrews, chapter ix. verse 27: "It is appointed unto men once to die, but after this"—decomposition. This statement is true not only as regards men, but as respects all other beasts. The word "beasts" is used here advisedly, for, from the naturalist's point of view, man is a beast and nothing else. Admitted at once that he is the highest of the beasts in organization, and by consequence in physical and mental capacity, still that does not alter the essential fact that he is a beast. In common, then, with all other beasts, certain elements enter into his composition. For the soft tissues those elements are carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus; for the hard tissues the elements are in a limited sense calcium, phosphorus, carbon and oxygen, forming phosphate and carbonate of lime in the bones and teeth. Those just enumerated constitute by far the greater bulk of the animal, although very small proportions exist of many other elements. For a longer or shorter time the individual man lives,—that is to say, the vital functions of waste and repair are carried on; but sooner or later, as the results of such accidents as violence or disease, or as a consequence of that impairment of vital functions popularly termed old age, he dies. At the moment of death all vital functions have ceased, and another kind of energy at once takes possession of the dead body,—the energy, viz., of decomposition. Bearing in mind the elements mentioned above, what are the results when a body is left freely to decompose in the open air? They are carbonic acid, water, ammonia, phosphoretted hydrogen and sulphuretted hydrogen. The carbonic acid and ammonia are the aerial food of plants. The rapidity of such decomposition would be determined by the temperature and moisture of the surrounding air. Bacteria and vibriones would find their way to the corpse, and the result would be putrefaction, evolving the gases already mentioned, accompanied by what is popularly termed a stench, and producing carrion. Leaving out of the account carrion-eating beasts, birds, and insects, and also carrion-eating larvæ of insects which are not themselves carrion-eaters, the gases already mentioned would be the results of the decomposition of the soft tissues and also of the organic portion of the hard tissues. After a time all that would be

left would be the inorganic portion of the hard tissues, consisting mainly, as already stated, of phosphate and carbonate of lime, in a pulverulent condition. This powder would be blown about by the winds, and scattered over the soil, where it would ultimately be dissolved by water containing carbonic and sulphuric acids, and thus be rendered capable of absorption by the roots of plants as part of their inorganic food. The phosphoretted hydrogen and sulphuretted hydrogen from the decomposition of the organic tissues would ultimately be converted into phosphoric acid, sulphuric acid, and water by oxidation. Thus the whole body would ultimately find its way back to the earth whence it was derived, to reappear in the shape of grasses (including cereals) and other plants, food for man and other beasts. Why, then, when nature so effectually disposes of the dead body, do human beings bury their dead? For two principal reasons, although perhaps few persons would ever stop to make the inquiry. In the first place, the stench is exceedingly unpleasant; and, secondly, the carrion-eating insects are particularly dangerous to the living. This last fact the writer has great occasion to remember, for only last summer he was bitten by one of those insects, and ran a great risk of losing his life in consequence. So, people bury their dead. How? A pit from six to eight feet deep is dug in the earth, and the body, either enclosed in a coffin or wrapped in a sheet, is laid at the bottom of the pit, and covered with the earth which had been taken from the hole. Frequently a stone slab is erected by "affectionate" friends, upon which are recorded the superhuman virtues of him or her who lies beneath. This hole is called a grave, a word derived from the Anglo-Saxon *graef*, having the same signification. The body is said to be buried or *interred* (from the Latin *in terra*),—*i.e.*, put in the earth. At the depth of six or eight feet precisely the same ultimate changes take place as when the body is left spontaneously to decompose with free exposure, as above described. It is doubtful, however, whether real putrefaction takes place at this depth; and the writer is somewhat inclined to think that the change is somewhat analogous to eremacausis or decay, for it is very questionable whether bacteria and vibriones can be alive and active at the depth of eight feet. One thing, however, is certain, and that is, that in the grave the process of decomposition proceeds much more slowly than it does at the earth's surface. Still, the ultimate results are the same. The carbonic acid, water, and ammonia, instead of being entirely dissipated in the atmosphere, would mostly be carried by water into springs and streams, as also the phosphates and carbonates from the bones and teeth. These substances would form the food of lacustrine, fluviatile, and marine plants, which would in their turn afford food to mollusca and fishes, and thus again become the food of man and other beasts. Thus nature has again effectually disposed of the dead body, but by burial the stench and the insects have been entirely avoided. Suppose now that the person has died from scarlet fever, or smallpox, or some other infectious disease, and that he has been buried within the limits of a city. Cities have drains and sewers, the surface openings to which are frequently very ineffectually trapped; fluids draining from the dead bodies may easily find their way into the sewers, a sudden gust of gas occasioned by some disturbance in the sewer contents may carry the infection of those diseases into the city atmosphere, and thus reproduce the diseases in the living. On the other hand, diseases may be swallowed,—*e.g.*, typhoid fever and cholera Asiatica. The fluids draining from bodies may easily carry those diseases into surface wells, whose water being imbibed may produce the disease in the living, or the decomposing fluids getting into the surface wells may form a *nidus* for other diseases. Such and other considerations lead to the conclusion that intra-mural cemeteries are exceedingly dangerous. All cemeteries ought to be situated a mile or two outside of city limits, away from drains, wells, or other direct means of contagion or infection. If such precautions were adopted and rigorously enforced, having due regard to the conditions and surroundings of the cemeteries, sepulture would be rendered perfectly safe from a sanitary point of view. Reference has already been made to the retardation of decomposition by burial. If before burial the body has been subjected to the modern process of "embalming," decomposition will be still more slow. The writer has already examined in his own laboratory several embalming fluids used by undertakers, and has found them all to consist chiefly of solutions of arsenite or arseniate of sodium. It is easy to see that such "embalming" might be used to mask crime, and, in point of fact, "embalming," as at present carried on, puts a premium upon murder by arsenical poisoning. This fact the writer

brought first to the notice of the medical profession in a paper "On Modern Embalming," published in the Philadelphia *Medical Times* of August 19, 1876, to which the reader is referred.

Cremation comes now to be considered. The word cremation is derived from the Latin *cremo*, I burn, and means the act of burning, with the special signification of burning dead bodies. In the year 1876 the world was thrown into a ferment by the news that the body of a German baron by the name of De Palm was to be burnt to ashes at Little Washington, a few miles from Pittsburg. A doctor of the name of Le Moyne (his own name may have suggested the practice, the French words *le moine* signifying the warming-pan) had constructed a crematory. The crematory consisted essentially of a fire-clay gas retort nine feet long, thirty-two inches wide inside by eighteen inches high inside, and two and one-half to three inches thick. The retort had an iron door in front, with bolts to secure it, a dozen one-inch holes on each side just above the bottom, and a six-inch hole at top, which communicated with the chimney. The retort was built in with appropriate brickwork, and was heated by a furnace placed underneath it. When a bright red heat had been attained, the body, supported on a light iron grating, and covered with a shroud soaked with alum, was thrust into the retort, the door in front was closed, and in a few hours nothing remained but ash. After the retort had cooled, the ash was collected and placed in an urn, and was doubtless labelled "Ashes of Baron de Palm, cremated at Little Washington, A.D. 1876." Before placing the body in this retort the fire is allowed to burn quite low, the strong draught takes a current of air through each of the twenty-four one-inch holes in the sides, and a powerful heat being radiated from the walls of the retort upon the dead body, combustion goes on, and the products of combustion are carried by the draught through the six-inch hole into the chimney. Considerable improvements might be made in this apparatus, but these are beyond the scope of this article, although the writer has mentioned the fact to the makers of this retort, the Messrs. Gardner Brothers, of Pittsburg.

Let us notice now the products of combustion of a dead body. In the Edinburgh *Weekly Scotsman* of Saturday, May 3, 1884, under the heading "Imperial Parliament," in the section "Dead (Regulations) Bill," Sir Lyon Playfair makes the following statements: "The body yields in the furnace the very same gases which it yields from the soil. The time only differs. In the one case, an hour is sufficient; in the other case, twenty years may not suffice. The ultimate processes are not merely similar, they are absolutely identical." Such statements delivered *ex cathedra*, as it were, by a gentleman of Sir Lyon Playfair's scientific and legislative position, are apt to be received by the general public *sine grano salis* and without examination. Nevertheless, the writer presumes to doubt the identity of the processes of burial and cremation even in their ultimate products. In burial the products are carbonic acid, water, ammonia, sulphuretted hydrogen, and phosphoretted hydrogen, the two last being ultimately converted into sulphuric and phosphoric acids. In cremation, if the process of combustion is perfect, the products are carbonic acid, water, nitrogen, uncombined phosphoric acid and sulphurous acid, the last being ultimately converted into sulphuric acid. In cremation, if the process of combustion is perfect, no ammonia whatever is formed, all the nitrogen being liberated as gas. Liebig, "Agricultural Chemistry," in the chapter on "Eremacausis of Substances containing Nitrogen," says, "When azotized substances are burned at high temperatures, their nitrogen does not enter into combination with oxygen;" "and in the same way the substances containing nitrogen give out that element in its gaseous form." Here, therefore, is one very important difference between burial and cremation. In cremation the nitrogen of the organic substances is thrown as gas into the atmosphere to add to the quantity of nitrogen which it already contains. Liebig again, "On the Origin and Assimilation of Nitrogen," writes, "We have not the slightest reason for believing that the nitrogen of the atmosphere takes part in the processes of assimilation of plants and animals." "But there are, on the other hand, numerous facts showing that the formation in plants of substances containing nitrogen, such as gluten, takes place in proportion to the quantity of this element which is conveyed to their roots in the state of ammonia, derived from the putrefaction of animal matter." In short, it is only in the form of ammonia that plants can take up nitrogen at all, whether by their roots or leaves, and that some plants do take it up by their leaves is certain. Everybody, therefore, that is cremated robs either water or atmosphere of so much ammonia, and to that extent the process of cremation is a wasteful interference

with nature's operations. This is one objection to cremation; but there are others.

The incombustible portion of the body, the ash remaining after the process of combustion is completed, is consigned to an urn. This ash consists principally of phosphate of lime, —*bone-earth;* but it contains also the ash of the muscles, the ash of the blood, and the ash of all other tissues and organs. In the urn it is absolutely useless,—it fulfils no function in nature. It has taken the living body perhaps seventy years to collect the few pounds of bone-earth which constitute the inorganic portion of its skeleton. By the process of burial all this bone-earth would ultimately have been returned to the earth from whence it came, or made otherwise, as above indicated, available for the food of man. Cremation robs nature of all this valuable phosphate, a substance without which no cereal plants can live. Here, again, is a wasteful interference with nature's operations. Remark here also the decided *non*-identity of cremation and burial in respect to the disposal of the phosphates.

Beyond the shadow of a doubt hundreds of corpses are every year consigned to the grave, the victims of secret poisoning. These cases have escaped the cognizance of the physician, but occasionally some suspicious *post-mortem* circumstance leads to the disinterment of the victim's body; the toxicologist discovers the poison; the murderer is hanged. Suppose, however, that the body has been cremated. If the poison has been organic, or one of the volatile metals, such poison cannot be found in the ashes, the crime is effectually concealed, the murderer goes scot-free, and even the slight check which the possibility of an investigation would afford has been completely removed by cremation. Here is another serious objection to the practice.

Putting aside all special pleading, in which the literature of this subject too much abounds, the writer thinks that from the foregoing considerations several conclusions may be drawn.

1. Considered merely as a measure of sanitation, cremation, as a means of disposing of the dead body, is perfect when properly performed.

2. As a measure of sanitation, when properly performed and under proper conditions, sepulture, as a means to the same end, is also perfect.

3. As an economic measure, cremation is faulty in the extreme, being wasteful and destructive.

4. As an economic measure, sepulture is much less faulty than cremation, being, to a certain extent, conservative.

5. As a testificatory measure, cremation cannot be entertained at all, for it completely destroys all physical testimony in cases of crime which the cadaver might afford.

6. As a testificatory measure, sepulture, to a certain extent, is satisfactory, for its tendency is to conserve the physical evidences of crime.

616 Penn Avenue, Pittsburg, Pa.

CHLORIDE OF SODIUM IN THE TREATMENT OF BRIGHT'S DISEASE.

Dr. Allard Memminger (*New York Med. Journal*, July 31, 1886) recommends the use of sodium chloride in the treatment of Bright's disease. He claims that this drug will produce a decrease in the amount of albumen and an increase in the amount of urea, and a very marked increase in the quantity of chlorides eliminated. He orders 10-grain doses of the chloride in gelatin-capsules three times a day, by preference one hour after or before meals, and directs the patient on the slightest intimation of nausea immediately to resume a recumbent posture, and there remain for an hour or so. The second day of treatment he increases the dose to two capsules three times a day, and every other day he increases by one capsule until the patient is taking five capsules three times daily. About this time he claims that the good effects of the treatment will be apparent, not only from the improvement in subjective and objective symptoms of the patient, but from the improvement in the condition of his urine. Albumen will of course at this period be found still in abundance if the case is at all a grave one. At this juncture Dr. Memminger directs the chloride to be diminished in quantity, and now gives the patient two capsules three times a day, stopping it temporarily if any nausea is produced. If the albumen is again found to increase and the urea and chlorides diminished, large doses are at once resumed. The effects of this treatment are found in the reduction of the albumen, an increase in the urea and chlorides eliminated, and the removal of headache, œdema, low spirits, general weakness, and anæmia. He claims that it is harmless if properly administered; its effects are uniform, and it may be employed as an adjunct to all recognized modes of treatment without detriment to the patient.

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Leading Articles.

THE MEDICAL ASPECTS OF THE NORTH-WEST.

THE importance of Switzerland to Europe as a playground is very great, but in the creation of North America the necessity of some such central spot seems to have been overlooked. This is especially unfortunate, since the temperament of our people leads them more and more to do twelve months' work in eleven months, and during the remainder of the year recuperate from the effects of this folly. Recuperation at a fashionable watering-place is usually as satisfactory in its results as trying to save a candle by burning the lower end. Mental rest, physical exercise, the open air, these are the necessities of the summer-time. The Adirondacks in New York, the North Woods in Maine, offer stamping-ground for the purpose; but to those who would wander among the high mountains, the far-off ranges of the West afford the only hope. The question of a vacation is to the physician a very practical one, both for himself and for his patients. We do not, therefore, hesitate to occupy a few pages in calling the attention of our readers to the far Northwest and its advantages. Moreover, this region probably presents a very favorable locality for the out-door treatment of consumption, although its claims and advantages seem hitherto to have been overlooked.

Western Dakota is in the northern portion of the dry belt which runs through the United States. It is similar in climate to Colorado, but differs from that State in not being distinctly mountainous, and in its plains not being highly elevated above the sea. There are certain cases of consumption in which the dry, cold air of Colorado acts beneficially, although the latitude and the consequent rarefaction of the atmosphere are trying to the patient. There are as yet, neither in Western Dakota nor in Montana, unless in a few towns, proper facilities for the care-taking of invalids, and for a person in the advanced stage of consumption to attempt to face the hardships of ranche-life would be absurd. The opportunities for occupation in Dakota, and still more in Montana, are, however, at present very good, and we would direct persons in the incipient stages of consumption to these Territories for permanent location. Montana contains numerous ranges of mountains, but its inhabited places are rather in the plains, and most of them are of lower altitude than are the Colorado resorts. The winters of Montana are also tempered by the so-called Chenook winds, which, blowing from the west, are at once so mild and dry that they lap up the snow and in a few hours leave bare the whole country.

In Dakota blizzards are more to be feared than in Montana, and the Chenook winds are less frequent and pronounced, although the inhabitants of Western Dakota claim that these reviving winds do reach them. Any person with feeble lungs settling in Dakota must either provide for staying in-doors during the existence of blizzards, or for living in the so-called Bad Land Country. The Bad Lands stretch over a wide amount of territory, running north and south some hundreds of miles, with a breadth of fifty or more miles east and west. They are composed of innumerable bluffs of earth two or three hundred feet high, fantastic in form, some conical, some truncated, some with broad tops, separated by narrow gulches, or, more rarely, by meadows a few hundred yards in width, but always so closely approximated that under their shelter cattle and people are almost as protected from the wind as within four walls. Last winter in the Bad Lands the thermometer fell as low as 60° below zero, but owing to the protection from the winds and the dry-

ness of the atmosphere this intense cold was so little felt that a calf dropped on Christmas-day, and left without shelter or any care, is not only healthy but has well thriven, and the manager of the ranche told us that only on three days had he found an overcoat necessary in riding.

In 1806, John Coulter left the Lewis and Clarke expedition to go to the Missouri River to hunt and trap. Escaping from the Blackfeet Indians, he lived for some time with the Bannock Indians, and in 1810 returning to St. Louis, gave an account of wonderful spouting springs and boiling caldrons which he had seen in the Rocky Mountains. By this he acquired a great local notoriety as the chiefest of modern liars, and the locality which he described was derisively spoken of by hunters as "Coulter's Hell." In 1844 one James Bridger penetrated to the locality described by Coulter, and on his return was no more believed than had been his predecessor. It was not until 1863 that the first credited description of the region now familiar as the Yellowstone Park was given by Captain De Lacy. The more recent history of this wonderful country is now known of by all men. We do not propose to inflict upon our readers any description of it at all, but only to say that after having wandered over the greater part of these United States except the California region, there are, in our opinion, only two places that are worth the trouble of getting at them: one is Niagara Falls, and the other the Yellowstone Park. Possibly the Mammoth Cave might be added to the list. The wonders and beauties of the Yellowstone can scarcely be exaggerated.

The amount of hot water that is going to waste in the Yellowstone region is sufficient to fill the heart of a Chinese laundryman with an agony of sorrow, and to make an American sanitarian look with pity and disgust upon the small springs of Arkansas and upon the rest of the world with profound contempt. There are in the Park simply thousands of hot springs of all magnitudes,—some mere pellucid pools, some trickling fountains, some spouting masses of water almost sufficient to supply a city. And it can scarcely be otherwise than that in the future some of these springs will be found to possess very valuable medicinal properties.

Generally speaking, most of the springs can be divided into two sets,—the calcareous or calcic and the silicious. The Mammoth Hot Springs is the most important of the calcareous waters. It is really a large collection of springs, which, commingling with one another, have by their conjoint effort deposited a mountain of carbonate of lime. Two of these springs have been analyzed by Dr. Henry Leffmann, of Philadelphia, with the following results. (See U. S. Geological Survey, 1878, part ii. page 389.) The Cleopatra Spring, water strongly alkaline, temperature 154°.

	Grains to imperial gallon.
Sodium chloride	13.496
Sodium sulphate	35.504
Calcium sulphate	13.587
Calcium carbonate	24.850
Magnesium carbonate	7.455
Silica	3.500
	98.392

Spring No. 17. Temperature, 165°. This may be arranged as follows:

	Grains to imperial gallon.
Sodium sulphate	34.370
Sodium chloride	18.900
Calcium carbonate	17.920
Magnesium carbonate	2.170
Silica	3.360
	76.720

A greater number of the Yellowstone springs are silicious, and deposit immense masses known as geyserite, which contains ninety per cent. of silex. An analysis of one of these, the Opal Spring, a silicious water in the Gibbon Geyser Basin, by Dr. Leffmann, gives the following result:

	Grains to imperial gallon.
Sodium chloride	82.180
Calcium sulphate	3.220
Silica	53.760
Calcium chloride	4.060
	143.220

The analysis of the Jug Spring of the Fire-Hole Geyser Basin resulted as follows:

	Grains to imperial gallon.
Sulphuric acid	1.400
Chlorine	19.180
Silica	14.560
Calcium	Traces
Sodium	34.440
	69.580

These analyses show that the springs of the Yellowstone are rich in mineral matter. But they do not fairly represent the resources of the region. Many of the waters are certainly strongly alkaline, and the immense masses of sulphur which are to be found in certain portions of the Park, as well as the deposits around many of the springs, show that these

waters are, some of them, also strongly sulphurous. The so-called Sulphur Mountain is a large butte full of small crystalline deposits of sulphur, and with sufficient sulphur emanations coming up through which to make liquid deposits upon the warm ground at the top,—drops of melted sulphur, which might well be spoken of as drops of golden dew.

A member of the United States Geological Survey told us that one of the springs is very rich in boric acid, and that a number of them contain a notable percentage of arsenic. Near the Mammoth Hot Spring is a lake of warm water in which the invalid might well disport himself for hours; suiting the temperature to his needs by shifting his position towards or away from the thermal springs which feed the waters.

The only place that we know of in the Northwest which is at present prepared for the treatment of disease by the use of water and bathing is that which is known as Hunter's Springs. This is situated a few hours of railroad riding this side of Livingston, near the Yellowstone River, whose rapid waters would afford for the invalid much amusement in the taking of large trout. There are three or four distant springs which furnish a very abundant supply of water both for drinking and bathing purposes. The hotel, which is just finished, is primitive but sufficient. There is a large bathing pool which reminded us forcibly of that at the famous baths of Luck in Switzerland, besides numerous bath-tubs, and all necessary arrangements for private bathing. The heat of the main spring is 168° F., and it has a specific gravity of 1.03 at 60° F. No analysis of it has ever been published, but we are enabled to give an original analysis made by Prof. Lehnen, of St. Paul:

	Grains to imperial gallon.
Solid contents	21.76
Magnesium carbonate	3.35
Ferrous carbonate	.16
Calcium carbonate	1.65
Potassium chloride	2.10
Sodium chloride	.15
Potassium sulphate	1.68
Sodium sulphate	1.38
Magnesium sulphate	7.07
Calcium sulphate	2.01
Alumina and silica	2.21
	21.76

The amount of solid matter in the Hunter's Spring water is not very great, but there are more salts than are contained in the Hot Springs of Arkansas, and it is probable that syphilitic, rheumatic, and skin affections could be very successfully treated by it. The spring already enjoys a considerable repute in the Territory of Montana, and at the time of our visit there were some eighteen or twenty people undergoing treatment.

Before the thermal springs of the Northwest can attract invalids from distant places much greater development must certainly take place, and we strongly urge upon the Northern Pacific Railroad authorities the policy of furthering such development. It would certainly pay the railroad, then, to have a thorough exploration of the springs of the Park made at their own expense. The United States government, however, as owner of this property, ought to develop it.

Attached to the present United States Geological Survey there should certainly be a chemist, who should have a sufficiently well-furnished laboratory in the Park to make careful studies on the spot of a large number of these innumerable hot springs. At present there are no facilities in the Park for the reception or care of health-seekers, although there are large general and well-managed hotels, and to them sanitariums could readily be attached.

ON THE USES OF IODOFORM IN VENEREAL DISEASES.

THE employment of iodoform in the treatment of venereal affections, though advocated as far back as in 1857 by Von Maitre, did not attain any repute with the profession until the disclosure of the eminent antiseptic virtues of the drug created a new and rationally founded base for its therapeutic exhibition. The fall of the previously excessively high price of the drug taking place about the same time aided of course no little the growing popularity of the remedy.

A decade or more having passed since the general introduction of iodoform into the therapeutics of venereal diseases, a critical review of the results of its clinical trials obtained thus far will be a study both timely and instructive.

Dr. Max Brockhart, treating of the same subject in the *Monatshefte für Praktische Dermatologie*, No. 1, 1886, has collected all pertinent literary material with such care and painstaking, that no abler guide could be selected for our discussion. We cannot, of course, view any other aspects of the proposed subject than those pertaining directly to the therapeutic practice. The following

divisions recommend themselves for convenience' sake:

I. Iodoform in the treatment of gonorrhœal affections.

II. Iodoform in the treatment of soft chancres and buboes.

III. Iodoform in the treatment of syphilis.

I. IODOFORM IN THE TREATMENT OF GONORRHŒAL AFFECTIONS.

Watson Cheyne* in 1880 first proposed iodoform as an application in gonorrhœa. He employed iodoform bougies made from cacao butter, with the addition of eucalyptus. This author claimed that by allowing the bougie to remain in the urethra for four to five hours daily, and by using astringent and antiseptic injections besides, the gonorrhœal inflammation could readily be controlled in seven to ten days. Campana† recommended in the first stage of an acute gonorrhœal urethritis an injection consisting of 6 dr. of iodoform and 3 grains of carbolic acid in 3 oz. of glycerin and 1 oz. of water. The researches of Mandl, Tarnowski, Keyes,‡ and Bockhart, however, could not verify the observations of Cheyne and Campana, and it soon became a therapeutic maxim that iodoform exerted not the slightest favorable influence over gonorrhœal inflammations of mucous membranes. Indeed, Bockhart even ascertained that a gonorrhœa of females treated exclusively with iodoform lasted longer than the cases treated with the usual disinfectant and astringent solutions.

Gonorrhœal epididymitis has also and even sooner than gonorrhœal urethritis been treated with various preparations of iodoform. Alvares proposed in 1877 the iodoform ointment, later Kurz the glycerite of iodoform, and finally Pape and Fischer the iodoform plaster. All of these authors claim to have obtained satisfactory results with iodoform in epididymitis, though Bockhart's experience could again not confirm them.

In erosions and ulcers of the cervix, however, such as are apt to follow a chronic gonorrhœa, iodoform, as all authors agree, renders the best of services. Dr. Wolf, of Würzburg, has the merit of having established a method of applying iodoform in these lesions which, in simplicity and promptness, surpasses all others. He fills little gauze sacks of the size of a chestnut with finely-powdered iodoform, and places them on the seat of the affection, where they are retained for twenty-four hours by means of cotton tampons. Previously the vagina, especially its cervical portion, is carefully washed out with two per cent. solutions of carbolic acid. Thus treated, even large erosions and ulcers disappear often in two to three weeks. To summarize, then, the first portion of our discussion, we may say that iodoform is of no service whatever in the treatment of gonorrhœal inflammation, but can claim for it a curative influence over ulcers and erosions of the cervix.

II. IODOFORM IN THE TREATMENT OF SOFT CHANCRES AND BUBOES.

Isard§ and Lazansky‖ claim the credit of having first called attention to the advantages derived from iodoform in the treatment of soft chancres. Isard laid particular stress upon the fact that the new remedy produced no pain by its application, and that compared with the formerly used means, its action was prompt and quick. He employed iodoform both as powder and in form of suspension in alcohol and glycerin (iodoform, 45 grains, alcohol, 2½ dr.; or, glycerin, 1 oz.), the former in superficially seated ulcers, the latter when cavities or concealed regions were to be reached. Lazansky introduced still another form of its application, viz., an ethereal solution (1 : 15 to 30), which is especially eligible when a protracted irrigation,—as in phagedenic ulcers of the anus,—is desired. Tarnowski noted that, under the influence of the iodoform treatment, the ulcers rarely assumed a phagedenic¶ nature, and that by the rapid elimination of the specific detritus the danger of auto-infection was materially lessened. Nearly all observers agree that treated with iodoform the soft chancre loses in about two weeks its contagious character and enters the stage of reparation. In small chancres a strong ethereal solution, applied three times daily, will give the best results; in larger ones, Unna's ether-spray or the powder-dressing** recommend themselves. Unna and Bockhart declare that the ethereal solution of iodoform, providing the ulcer with a suitably thin layer of the drug, gives better results than the powder itself. In soft chancres sit-

* *Brit. Med. Journ.*, 1880, and *Lancet*, 1882.

† *La Salute*, 1883.

‡ *Journ. of Cut. and Ven. Dis.*, 1883.

§ Nouveau Traitement de la Maladie vénérienne par l'Iodoforme. Paris, 1871.

‖ Das Iodoform und seine therapeutische Verwendung, *Vierteljs. f. Der. u. Syph.*, 1875.

¶ Or diphtheritic.

** Changed every twenty-four hours.

uated in the phimotic prepuce, Isard's suspension of iodoform in alcohol and ether, as stated above, is a choice application in phagedenic or diphtheritic ulcers; the powder is preferable, and in chancres located in the urethra iodoform bacilli are indicated. The introduction of Unna's grated iodoform-mull into the therapeutics of the soft chancre (*vide Monatshefte für Praktische Dermatologie*, 1884, p. 242) deserves an especial mention as a decided progress in the technique of dermatological practice. To epitomize the above, we may assume from the exceedingly rapid and favorable action of iodoform upon all kinds of soft chancres that the drug is a specific against the virus of the soft chancre. At least it is certain that no other drug, if it be salicylic acid, resorcin, or nitrate of bismuth, can even approximately be compared with iodoform in healing effects upon the soft chancre. We can also add that these effects do not refer to the mechanical absorbent action of the powder-dressing, for other powder-dressings, such as those of nitrate of bismuth or oxide of zinc, do not have the same curative influence. We are compelled to believe in a chemical influence of the iodoform upon the virus of the soft chancre.

In the therapeutics of suppurating buboes resulting from soft chancres iodoform claims the character of a sovereign remedy. Isard and Petersen* even credit the drug with abortive or preventive virtues regarding this suppurative inflammation, the former employing for the purpose iodoform ointment, the latter iodoform collodion. Still, this abortive power attributed to iodoform is not universally acknowledged. Very certain, however, is it that suppurating buboes under the iodoform treatment heal twice as rapidly as under the old forms of treatment. Under an exactly applied iodoform dressing, and strict observance of antiseptic precautions, the opened bubo never becomes phagedenic, diphtheritic, or chancrous in nature.

The principal methods of applying iodoform in suppurating buboes deserve to be especially alluded to:

1. Lazanski puts iodoform into the disinfected wound, and applies cotton lint (charpie), caoutchouc-paper, and a roller-bandage over it, changing the dressing every twenty-four hours.

2. Martini employs precisely the same method, with the addition of scraping the wound with the sharp spoon.

3. Petersen's plan is undoubtedly the most perfect one. He employs what is known as the occlusion-dressing, adding pressure to the dressing, as stated above. In this dressing flannel bandages only are used. With a perfectly fitting occlusion-dressing the patient is well able to walk about with impunity.

Hence the conclusion to be arrived at from the foregoing statements is that iodoform is an unexcelled remedy in suppurating inguinal buboes, and that it is best applied by the plan proposed first by Petersen.

III. IODOFORM IN THE TREATMENT OF SYPHILIS.

Iodoform has been tried partly as a substitute for mercury by those opposed to the mercurial treatment of syphilis, and partly in place of iodide of potassium in the treatment of the tertiary forms of syphilis. The estimation of various observers of the value of iodoform as an antisyphilitic remedy varies materially. Von Maitre recommended first its internal use in syphilis, and claimed that 45 grains could be ingested daily with impunity. Davenport† gave it in secondary syphilis, together with iron. Lazanski gave daily to twenty syphilitic patients (tertiary form) six to eight pills each, consisting of 1½ grains of iodoform, and pronounced the action of the drug very efficacious. Moleschoff,‡ likewise, eulogized iodoform in syphilis, and called attention to the fact that this drug is much more slowly eliminated from the economy than mercury, and is for this reason therapeutically more active than the latter.

Other authors, however, like Zeissl, Strokowski, Tarnowski, and Mraceck, after careful and numerous observations, have come to the conclusion that iodoform given alone internally in syphilis is but little reliable and useful. It is to be added that the drug causes certain secondary symptoms, such as gastric disturbance, vomiting, an acne-like eruption, and nervousness, rendering its exhibition practically ineligible. Although the percentage of iodine contained in iodoform is much larger (ninety-six per cent.) than that contained in iodide of potassium (seventy-six per cent.), it is, nevertheless, possible to introduce into the system by the latter drug in a short time far greater quantities of iodine than by the former. Besides, iodoform cannot be taken with impunity in larger daily doses than 15 grains, while of iodide of potassium much greater quantities are well borne.

* *Monatshefte*, 1883, No. 10.

† *Boston Med. Journ.*, 1873.

‡ *Wien. Med. Woch.*, 1878.

The results obtained with subcutaneous injections of iodoform, as proposed by Bozzi in 1870 and Thomann* in 1881, are sufficiently satisfactory to engage our interest. The latter employed the glycerite of iodoform (6 to 20), and iodoform dissolved in oil of almonds† (0.3 to 6), using as an average dose as much as 12 grains of iodoform. Both in recent and in tertiary syphilis these authors obtained very gratifying results, 3 to 4 dr. of the drug being required for the cure of tertiary lesions. The local reaction after injections of iodoform is immaterial; the pain soon passes away, as do the induration and redness of the place of injection. An abscess has been recorded in only a single instance. Neumann used besides glycerin still other vehicles for his subcutaneous injections of iodoform, such as ether (1 to 6), castor oil (1 to 15), and ether and olive oil (5 āā).

Neumann found by experiments on animals that from the glycerite of iodoform ⅓ grain of iodoform, and of the ethereal solution ⅔ grain of iodoform were resorbed daily. In a case where Mraceck had given in thirteen days 1½ dr. of iodoform, he noted the elimination of the drug in the urine for a period of forty days. In another case, Thomann found iodine in the urine forty-three days after the last injection of the glycerite of iodoform. These observations demonstrate that the glycerite of iodoform applied subcutaneously acts similarly as calomel applied hypodermically: from the drug deposited into the cellular tissue small quantities are being constantly and for a long time dissolved, and enter the circulation. This peculiar action of iodoform renders the drug particularly eligible in the light tertiary forms, while in the grave gummous processes, necessitating the rapid introduction of larger quantities of iodine, iodide of potassium, being more rapidly and in greater quantities resorbable, is far preferable. In conclusion, the beneficent action of iodoform in syphilitic neuralgia is to be mentioned. Daily doses of 15 grains of iodoform, taken in pill form, are regarded as a promptly-acting remedy.

To resume the above, we find iodoform as an antisyphilitic remedy inferior to iodide of potassium, surpassing the latter only in syphilitic neuralgia. Employed subcutaneously, however, the drug, especially in the light tertiary forms, produces a far more constant and effective an action on the organism than iodide of potassium.

THE PHYSIOLOGICAL ACTION OF IODOFORM.

Our knowledge of the physiological action of iodoform has in the last few years been materially enriched by the labors of Prof. Binz‡ and other German observers. Let us review in brief the essential features of the physiological action of the drug. Placed upon an ulcerating surface, iodoform is gradually dissolved by the fatty substances present in that locality, and liberates iodine in presence of oxygen and light or of oxyhæmoglobine and living cells. It is to the thus continually generated free iodine that the antiseptic and antibacterial virtues of iodoform are to be ascribed. The action of iodoform upon the blood-corpuscles is a very singular one: it prevents their emigration from the blood-vessels by paralyzing the protoplasma of the blood-cells, and besides, prevents the formation of giant-cells. The analgesic effects of iodoform upon ulcers are explained by Binz as being due to a paralysis of the axis cylinder of the exposed nerve termination produced by the liberated iodine. The iodine enters also the juices of the body and associates with their albuminous constituents, the thus formed albuminate of iodine being, however, soon decomposed into an iodide and an iodate. In tissues of an acid reaction (the cortex of the brain and gastric mucous membrane) iodine regains its former state of integrity, and again reacts upon the cells of the part. This explains the partly irritating and partly depressing influence of iodoform upon the cervical cortex and its tendency to provoke serious gastric disturbances. Experiments made upon animals revealed fatty degeneration of the heart, the liver, and the kidneys as the result of the action of iodoform. Even after the ingestion of large quantities of iodoform, the resorption from the intestinal tract is very limited as compared with the resorption proceeding from granulating surfaces and wounds. In the urine iodoform appears as an iodide and an iodate. This elimination proceeding, however, very slowly, the action of the drug upon the economy is evidently a prolonged one.

We cannot conclude our discussion without

* *Centralblatt für die Med. Wiss.*, 1881.

† Solutions of iodoform are to be preserved in a dark bottle, else iodine will be liberated, and applied hypodermically will prove highly irritating.

‡ Binz and Möller, Uber das Iodoform und über Iodsäure, *Arch. f. exp. Path.*, 1877; Binz, Toxicologisches über Iodopreparate, *Arch. f. exp. Path.*, 1880; Binz, *Virchow's Archiv*, 1882, vol. lxxxix.; Behring, Uber Iodoform Intoxicationen, *Deutsche Med. Woch.*, 1882.

referring with a few words at least to the intoxication phenomena, as occasionally recorded after the application of iodoform. In the first place we mention the acne not rarely observed after the internal and subcutaneous employment of iodoform, resembling closely the acne produced by the internal use of iodide of potassium. Besides this acne a peculiar exanthematous dermatitis is often observed after the external application of the drug, especially in presence of a certain predisposition on the part of the patient. This eruption is readily cured by a dressing with argillaceous earth, or with a two per cent. solution of carbolic acid in alcohol. Grave cerebral intoxications, such as frequently described by surgical writers, occur but rarely in the treatment of venereal affections, unless it be in presence of the idiosyncrasy mentioned above. Besides, iodoform is no longer used in such large quantities as was practised in the past. Oberländer* reported two grave intoxications with iodoform which deserve to be noted. Two syphilitic patients, who had received 10 dr. of iodoform in eighty days, *i.e.*, 75 grains in seven days, showed threatening cerebral symptoms, such as coma and collapse, which persisted for a long time, and finally passed away.

To disguise the repulsive odor of iodoform many agents have been proposed, among which we mention cumarine, the tonga-bean, the oil of peppermint, the oil of bitter almonds, Peruvian balsam, Muscat balsam, tannic acid, and recently pulverized roasted coffee.† This agent being itself an antiseptic, and incorporable with iodoform in any proportion, is undoubtedly the safest, as it is the most effective of all substances recommended for the disguise of the odor of iodoform. If the chancrous ulcers of the penis are treated with Unna's grated iodoform plaster-mull, the taste of the drug is easily disguised by fixing a layer of odorized cotton (with cumarine) over the plaster.

ON ANTIFEBRIN, THE NEW ANTIPYRETIC.

FROM Prof. Kussmaul's clinics at Strasburg Drs. Cahn and Hepp send the good news of the discovery of a new and great antipyretic into the professional world. We abstract from the *Centralblatt für Klinische Medicin*, August 14, 1886, a *résumé* of the properties and action of antifebrin.

* *Deutsche Zeitschrift für Prakitsche Medizin.*, 1878.
† Opler, *Centralblatt für Chirurgie*, 1885, No. 30.

"A happy incident," the authors say, "has placed in our hands a preparation which was found to possess excellent antipyretic virtues." A chemical examination proved the drug to be a long-known chemical body which owns the formula of $C_6H_5NHC_2H_3O$, and belongs to the group of phenyllacetamides or acetanilides. It was prepared as far back as 1853 by Gerhardt (*Annalen*, lxxxvii. 164), by the action of aniline upon acetylchloride or anhydrous acetic acid. Antifebrin is a white, crystalline, and odorless powder, slightly pungent, almost insoluble in cold water, sparingly soluble in hot water, but readily so in alcohol. It melts at 113° C., and distils unchanged at 292° C. It owns neither acid nor basic properties, and strongly resists the majority of reagents.

Numerous experiments on dogs, guinea-pigs, and rabbits have convinced the named observers that the drug can be ingested in relatively large doses without provoking any toxic symptoms, differing in this respect materially from aniline ($C_6H_5NH_2$), with which it is chemically closely allied. The temperature of normal animals is not influenced by the drug.

Cahn and Hepp have tried the new antipyretic in the following twenty-four cases:

	Cases.
Typhoid fever	8
Erysipelas	5
Acute articular rheumatism	2
Pulmonary phthisis	4
Abscess of the lungs	1
Fever in leucæmia	1
Pyæmic fever	1
Septicæmia	1
Pneumonia migrans	1

The remedy was given in single doses of 4 to 15 grains, stirred up in water, dissolved in wine, or enclosed in wafers.

The maximum dose given in twenty-four hours was 31 grains. The proper size of the single dose cannot, as in all antipyretics, be determined *a priori*, but depends upon the type, the gravity, and stage of the affection. It is safe to regard 4 grains of antifebrin as equal to 16 grains of antipyrin, regarding time of appearance, duration, and magnitude of the antipyretic action. Consequently it will be seen that antifebrin, however scantily soluble, acts as quickly, and four times stronger, than antipyrin. As yet the drug has never failed in the hands of the Strasburg clinicians.

The following illustrates the mode of distribution of the new remedy in several cases, and at the same time allows of a comparison with antipyrin regarding antipyretic power.

Typhoid Fever. Workingman, aged 19 Years.

	July 3, 7th day.	July 10, 14th day.	July 11, 15th day.	July 12, 16th day.
	Pulse.			
7 o'clock	39.2° C. 88	39.8° C.	39.7° C.	39.3° C.
10 "	40.0° C.	40.2° C.	40.2° C.	39.9° C.
12 "	40.2° C., 7 gr. antifebr.	40.2° C., 7 gr. antifebr.	40.4° C., 32 gr. antipyr.	40.4° C., 7 gr. antifebr.
2 "	38.6° C. 88	38.8° C.	38.5° C.	38.8° C., 7 gr. antifebr.
3 "	37.8° C., 4 gr. antifebr.	38.7° C., 4 gr. antifebr.	32 gr. antipyrin.	
4 "	37.8° C. 68	38.9° C.	39.2° C.	37.8° C.
5 "	38.4° C. 68			
6 "	39.0° C. 80	40.4° C.	40.2° C.	40.0° C.
7 "	40.0° C. 88			
8 "		40.3° C.		39.9° C.

Typhoid Fever. Woman, aged 39 Years.

	July 20, 12th day.	July 21, 13th day.	July 22, 14th day.
7 o'clock	39.4° C.	39.0° C.	39.3° C.
10 "	38.9° C., 4 gr. antifebr.	38.8° C., 16 gr. antipyr.	39.7° C., 4 gr. antifebr.
12 "	37.2° C.	37.8° C.	38.7° C.
2 "	37.2° C.	37.5° C.	38.5° C.
4 "	37.8° C., 4 gr. antifebr.	38.4° C.	39.4° C., etc.
6 "	38.4° C.	39.1° C.	
8 "	37.8° C.		
10 "	37.7° C.		
12 "	39.0° C.		

Phthisis Pulmonum. Woman, aged 22 Years. (*Patient received Antifebrin for Twelve Days and Antipyrin for Two Days.*)

	July 15.	July 16.	July 17.	July 25.	July 26.
7 o'clock	38.4° C.	38.7° C.	38.5° C.	37.3° C.	37.3° C.
10 "		38.8° C.	38.6° C.	38.6° C.	38.5° C.
12 "	39.1° C., 4 gr. antifebr.	39.1° C., 16 gr. antipyr.	38.6° C.	38.3 C., 16 gr. antipyr.	38.9° C., 4 gr. antifebr.
2 "	37.8° C.	37.6° C.	39.2° C., 4 gr. antifebr.	37.8° C.	37.8° C.
4 "	37.0° C.	37.8° C.	38.7° C.	37.8° C.	37.4° C.
6 "			37.4° C.	38.5° C.	37.6° C.
7 "	39.6° C.	38.6° C.			
8 "			36.8° C.	38.7° C.	37.9° C.

As seen from this table, the antipyretic action of antipyrin sets in about one hour after its exhibition, reaches its maximum after about four hours, and passes off in from three to ten hours, according to the dose employed. In doses sufficiently large to reduce a high febrile temperature to the normal status or even lower, the apyrexia persists usually four to eight hours. The fall of temperature is accompanied by reddening of the skin and moderate perspiration.

In the reascent no rigors were ever observed, though in some instances the patients had—as after the use of antipyrin—sensations of cold. Simultaneously with the fall of temperature, the observers noted a considerable reduction in the frequency of the pulse and an increase in the arterial tension.

The gastro-intestinal tract bears the new remedy undoubtedly well, for in no instance was there any nausea, vomiting, or diarrhœa observed. In several cases, on the contrary, the improvement of appetite following the use of the drug* was quite apparent.

Notable were also in a number of cases the great thirst of the patients and the profuse diuresis appearing during the period of apyrexia. No patient complained about the med-

* In all probability due more to the relief brought by the apyrexia than to any especial action of the drug on the digestive tract.

icine, and the general subjective state of health was quite favorable during the use of it. In one of the cases of rheumatism antifebrin caused a prompt relief from very troublesome pains in the joints. The only symptom which at first startled the experimenters was a peculiar cyanosis appearing in some patients on the face and extremities, which appeared and disappeared simultaneously with the apyrexia, without causing rigors or any other symptoms. In some instances the patients grew somnolent during the apyretic period.

Besides the advantages above alluded to, viz., prompt action in small doses, absence of secondary symptoms, and comparatively slight transpiration, the new remedy commends itself also on account of its cheapness.*

It is theoretically interesting to find that this antipyretic belongs to a chemical group wholly different from that which includes the other antipyretics, which are either phenols (carbolic acid, hydrochinon, resorcin, salicylic acid), or belong to the chinoline order (chinolin, kairin, antipyrin, quinine, thallin).

Antifebrin is a neutral body, far removed in chemical composition from either of these groups.

KOLA NUT.

WE have in several previous issues of the GAZETTE called attention to the action of the kola nut, and a paper recently published by Dr. N. Hudson (*Med. Times*, June 26, 1886) still further encourages more definite trials of this remarkable agent. Dr. Hudson reports a case of intermittent and irregular heart's action, with dyspnœa and faintness, occurring as a consequence of endocarditis in a rheumatic subject, in which the use of about 150 grs. of kola paste, taken once or twice a day, in hot milk, prepared like chocolate, caused great relief. The heart's action became more regular, dyspnœa and faintness disappeared, and the violent headaches to which the patient had been previously subject were prevented. The employment of the kola seemed to be satisfying to the appetite, and the bodily weight increased from ninety-eight to one hundred and five pounds. No marked change was observed in the character of the urine, the quantity voided being somewhat increased, but the total quantity of urea excreted remaining at 10 or 12 grammes daily. The action of kola is generally attributed to the caffeine which it contains, but Dr. Hudson states that in this case both caffeine and convallaria had been employed without success, while the action of digitalis was only temporary and palliative.

* Kalle & Co. sell a moderately pure article for thirty marks per kilogramme.

NOTE ON HYPNONE.

URETHAN, Jaksch's discovery, announced last year with so much *éclat* and auspicious anticipation, has been unable to establish itself in the faith of the profession, and it is little likely that the coveted sanctum of any Pharmacopœia will ever open itself to a remedy of so uncertain and unreliable a nature. Hypnone, the successor of urethan, appears to be no luckier than the latter. It has figured in the medical journals for some time, was complimented on its felicitous name, and —"the rest is silence."

Hirt and Moebs, of Breslau, went to the expense and trouble of instituting exhaustive experiments with hypnone, giving the drug in as large doses as 7 grains, and were naturally rather grieved to find the results obtained wholly negative, especially in view of Jaksch's loud claims as to the virtues of the drug. The experimenters write to the *Breslauer Artzliche Zeitschrift:* "The results obtained with hypnone were in every instance positively illusory, and the drug ought to attract no more attention from the profession."

The above sentence will no doubt be condemned by other observers, but it seems as if the drug is doomed to oblivion.

THE NEW EDITION OF DR. FLINT'S PRACTICE.

WHEN a medical book has been the chief guide for many years for the practitioners of at least one continent, its fate upon the death of its author becomes a matter of general concern. Usually the book falls into the hands of an editor. Occasionally the man selected has sufficient nerve and ability to swallow the book, assimilate it, and send it forth with the stamp of his own personality blending with and overriding that of the original author. Under these circumstances the work becomes a new book, and may be endowed with a life for another generation. Usually, however, the editor prunes, interjects, and variously alters the old favorite, so that it becomes like a tree which has not

grown by the physiological process of interstitial deposit, but has had grafted on it here and there a new limb, and finally produces an abundance of discordant fruit. Such an alteration of a great medical classic is a woful mischance: ruinous to the reputation of the original author; misleading to the rising youth of the profession. As Dr. Austin Flint, Jr., however much of fame he may have achieved in other lines, is not known as a clinician, on reading the announcement of a new edition of his father's Practice of Medicine we had greatly feared that the book would be found to have suffered at the hand of some alien editor. It is, therefore, with great pleasure that we learn that Dr. Austin Flint himself completed the revision of the book before his death. We trust that the sale will be both extensive and rapid, and the volume in its perfected form will be widely placed upon the shelves of our readers as the monumental life-work of its great author. We also hope that in the future the publishers will take care that its shapeliness is not defaced by editorial chisellings or bracket-enclosed excrescences.

According to our thinking, Dr. Flint was not a man of genius, although endowed with good judgment and excellent powers of reasoning. A man of marked ability, but not of originality, he achieved by infinite painstaking labor. It is stated that the basis of his practice was an unbroken series of records of cases, in private practice and hospitals, begun in 1833 and continued until his death. The mere manual labor of writing the sixteen thousand nine hundred and twenty-two folio pages of manuscript was not a little thing. And it is said that these pages are all in Dr. Flint's own handwriting.

Reports on Therapeutic Progress.

THE PHYSIOLOGICAL TREATMENT OF CHOLERA AFTER SEMMOLA.

We abstract from a recently published work of Semmola ("Nuove Ricerche terapeutiche sul Cholera Asiatica")—in which this well-known Italian clinician has laid down the clinical and therapeutic experiences gathered during the recent Italian epidemic of cholera—his views on what the author calls the "physiological treatment of cholera." Semmola holds that no cure can ever be expected from any medication directed specifically against the comma-bacillus, and also warns of too heroic a therapeutic interference with the symptoms of the premonitory and the algid stages.

A physiological treatment, in the judgment of the author, is one which is directed towards raising the vital energy of the body, so as to endow the same with a higher power of resistance against the disease without injuring the entire system by the biochemical action of pharmacal agents.

The main features of this treatment are the following:

1. Absolute rest of the affected organs—viz., the gastro-intestinal tract—by observing a strict fasting on appearance of the first diarrhœa stools. As long as the diarrhœa persists no food whatever is to be taken. Over six thousand clinical observations in Naples have shown that even 5 to 6 teaspoonfuls of bouillon, given prematurely (*i.e.*, before the stoppage of the diarrhœa), sufficed to reproduce the gravest symptoms, such as algidism and asphyxia. After the disappearance of diarrhœa and vomiting, milk may be given in very small quantities.

2. Timely excitation of the physiological powers by therapeutic or, rather, by physiological means. The best of these are undoubtedly repeated warm baths. To prove beneficial the baths must, however, be given in the first period of the disease, before any sign of algidism has set in. The application of the warm bath in cholera has been in vogue also in former times, but never yielded any benefits, as it was only employed in the algid stage of the affection. The warm bath is not alone useful, as was held formerly, on account of the supply of heat to the cold surface of the body,—a mere physical process,—but also and particularly on account of the physiological influence it exerts on the economy. The warm bath excites the peripheral nervous system, and at the same time, by reflex action, the centre of circulation. The consequence of this excitation is an harmonious restoration of the functional physiological relations between the surface of the body and its internal apparatus, especially those of the digestive tract. True, this biological process can only be realized in the first stage of the disease, when the biological relations between the superficial and internal organs have not yet been essentially altered or broken off altogether.

Through diaphoresis the bath favors besides the elimination of toxic substances from the system, which by affecting the various nerve-centres cause ominous alterations in the se-

cretory, vaso-motoric, and general oxidation processes. If necessary, the bath can be repeated every one to two hours. After the bath the patient is to be wrapped up in woollen blankets, and is to be given warm aromatic and weak alcoholic drinks. It is well to give also small doses of opium (laudanum, liqueur de Batteley, chloridine), in order to render the nervous centres less susceptible for the toxic principles and in order to reduce the increased intestinal secretion. Opium, given at the proper time, aids and supplements the physiological treatment.

ON IODOL, THE NEW ANTISEPTIC.

Two recently-published papers on iodol, one by G. SCHMIDT ("Das Iodol, ein neues Antisepticum," *Berliner Klinische Wochenschrift*, 1886, No. 4), and the other by FR. PAHL (*Untersuchungen über Iodol, Diss.*, Berlin, 1886), disclose some additional facts in reference to this new antiseptic agent. Schmidt employed iodol at the university clinics of Heidelberg in the following forms: 1. As a powder, applied to the wound like iodoform; over it a compress of argillaceous earth is fixed. The iodol formed no scab with the secretion, the secretion itself was odorless, the granulations abundant, and the healing of necrotic ulceration-surfaces satisfactory. 2. As a solution, 1 : 16 alcohol + 34 glycerin, intended for tampons in carcinomata of the uterus and rectum, also for injections in fistulas and ulcerative cavities. 3. As iodol gauze.

Schmidt expresses himself thoroughly contented with the results obtained with these various modes of iodol application, and lays particular stress upon the absence of all intoxication phenomena in the use of the new antiseptic. He believes, however, that the granulations obtained from the use of iodoform are more luxuriant than those appearing after the employment of iodol.

Pahl, who conducted his researches on iodol in the Pharmacological Institute at Berlin, commends, likewise, the use of iodol, especially in view of its "comparatively slight toxic qualities." His experiments made with iodol on various animals invite our particular interest. If large doses are given to animals, Pahl says, the animals grow emaciated, and ultimately perish through general weakness. The post-mortem examination reveals invariably fatty degeneration, especially of the liver and kidneys. Iodol is almost totally decomposed in the organism, and is eliminated as an iodine alkali through the urine. Pure iodine appears never in the urine after the use of iodol.

PULSATILLA.

According to M. BRONEVSKI, in *L'Union Méd.*, anemonin, a substance prepared from the *anemoni pulsatilla*, first irritates, then paralyzes the respiratory centre. It diminishes cardiac activity and voluntary movement by its action on the spinal nerve-centres. It causes death in dogs and rabbits by paralyzing the heart, in doses of 3 grms. of the extract administered subcutaneously. This quantity corresponds to ten of infusion or decoction and to one to two of the tincture. 0.1 grm. of anemonin proved fatal to a rabbit in an hour; dogs succumbed to a subcutaneous injection of 2 grms. in from twenty-four to thirty-six hours, with increasing dyspnœa, torpor, paralysis of all the limbs, diarrhœa, and cessation of cardiac movement. Autopsy showed hyperæmia of all the parenchymatous organs. Therapeutically, anemonin is useful in bronchitis, convulsive cough, and asthma. The daily dose is from 0.05 to 0.1 grm. taken twice in powder. A larger dose causes headache and heaviness in the limbs.—*Med. Press*, August 11, 1886.

THE CAUSE OF THE TOXIC ACTION OF CHLORATES.

From the *Archiv für Experimentelle Pathologie and Pharmacologie*, vol. xxi. p. 169, we abstract some conclusions of DR. STOCKVIS on the poisonous action of chlorates, which, for the sake of their novelty, invite our interest.

The doctrine held heretofore, that the chlorates exert an oxidizing, and consequently decomposing, influence upon the living blood, is no longer tenable. The toxic action of large doses of chlorates refers solely to their action as salts.

If the chlorates were actually reduced in the living organism, the urine would necessarily present a deficit in the quantity of eliminated chlorates. True, a slight deficit in the chlorates has always been determined in the urine, but it must be remembered that a small portion of the chlorates passes unchanged into the saliva, and, besides, the elimination of the chlorates in the urine is not yet ended in twenty-four hours, the urine voided later always containing some more

chlorate. It has also been determined that the urine, on standing for some time, reduces a chlorate into a chloride.

Chloride of sodium materially increases on the day of its ingestion the quantity of the chlorides in the urine, while the chlorates are present in their maximum quantity.

After the withdrawal of chlorates the elimination of chlorides decreases simultaneously, although the urine still contains some chlorate. The increase in the elimination of chlorides is wholly independent from the quantity of ingested chlorates; it is, for example, just as large after 15 grains as after 30 grains.

This increased elimination of chloride of sodium refers by no means to a reduction of chlorates, as is demonstrated by the following example: Of two rabbits who were starved until their urine contained no more chlorine, one received 60 grains of chlorate of sodium and the other 60 grains of nitrate of sodium. These two salts caused a relatively great and almost equal elimination of chloride of sodium, which disappeared on the following day.

Another evidence against the reduction is the fact that even very small quantities of chlorates pass into the urine unchanged. It is only outside of the body in experiments with blood, in autopsies, etc., that this reduction of chlorates actually takes place. Of the chemical constituents of the animal organism none is able to reduce chlorates outside of the body at the temperature of the blood; the urine itself, though, is, as intimated above, well able to reduce chlorates.

Having thus shown that the reduction of chlorates is not the cause of the toxic action of these salts, the author passes to the discussion of what constitutes this cause. He found experimentally that chlorate of sodium exhibited by intravenous injection is not more and not less poisonous than the ordinary table salt, and that hence the latter could, with equal propriety as the former, be called a poison. The lethal dose was for both salts 8 to 10 grammes per kilogramme of body weight. The phenomena, after the injection of salt, were at first irritation, then depression of the central nervous system, albuminuria, and œdema of the lungs. The chloride of potassium appeared strangely to be even more poisonous than the chlorate of potassium.

The "toxic gastritis" usually found after poisoning with chlorate of potassium is the result of the introduction of a large quantity of an irritating salt into a mostly empty stomach, and the high-graded dyspnœa, the deep cyanosis, the cardiac weakness, and the convulsions are partly reflex phenomena emanating from the toxic gastritis, and partly refer to the action of potassium, or that of a concentrated solution of salt on the blood.

The author gives, in conclusion of his paper, the following practical suggestions: The chlorates ought not to be given in too large quantities at once, and not in too concentrated a solution (one and one-half to two per cent.), nor on an empty stomach. The average dose for an adult may reach 2 drachms *pro die*. If the urinary secretion is scanty, for one reason or another, the chloride of sodium is preferable to the chloride of potassium, as the slower elimination of the potassium salts may in these cases easily lead to an intoxication.

In connection with this paper, we find the mentioning of a case of poisoning with chlorate of potassium with a lethal termination. A man took by mistake 4 drachms of the drug in two hours, and died in twelve hours.

THE PHYSIOLOGICAL ACTION OF MENTHOL.

Dr. Goldscheider, at a meeting on April 9, of the Physiological Society of Berlin, discussed the action of menthol on the sensory nerves. It was well known that it produced on the skin a sensation of cold, which was commonly ascribed to evaporation. On the other hand, the same sensation, when produced in the mouth by solutions containing menthol or peppermint, was explained by a supposed astringent effect. Dr. Goldscheider had come to the conclusion that neither of these explanations was correct. He made his experiments with a solution of menthol in lanolin, which he rubbed into circumscribed regions of the skin. After the rubbing, the thermometer showed, in all such places, an increase of temperature to the extent of 2° C., notwithstanding the marked sense of cold produced. The hypothesis of evaporation was excluded by the fact that the feeling of cold was no less marked when the part rubbed was covered with a watch-glass, and could, therefore, be produced only by direct stimulation of the nerves of sensation of cold. Again, if of corresponding places on the forehead, where these nerves are most abundant, one were rubbed with the menthol ointment, and the other not, bodies which previously had caused no particular sensation would be felt as cold on the former spot, but not on the latter. Dr. Goldscheider, observing that

while some regions, as the forehead, were especially sensitive to cold, others, as the elbow and the volar side of the wrist, were so to heat, found that the inunction of these with menthol produced a sensation of warmth, though less striking than that of cold in the former regions; and he called attention to the recent communication of Professor Herzen on the precisely analogous results of pressure on the nerve-trunks in these regions respectively. He therefore concluded that the sensations, in some places of cold, and in other places of heat, produced by menthol, were purely subjective and consequent on the direct stimulation of the special nerves of temperature, those usually cognizant of cold being far more sensitive to its influence than were those adapted to receive impressions of higher temperatures.—*Brit. Med. Journ.*, August 21, 1886.

IODOL.

Among the many new antiseptic remedies that recently have been introduced into surgical practice, iodol is among the most likely to retain its place. Iodol, or the powdered iodide of pyrrol (C_4I_4NH), is a light fawn-colored micro-crystalline powder, odorless, and almost tasteless. It contains 88.9 per cent. of iodine. It is soluble in warm oil, 1 to 7; alcohol, 1 to 3; and ether, 1 to 2; and also in chloroform. It has been used powdered as an application to phagedenic chancres and for syphilitic sore throat, and Dr. Foy (*Med. Press*, August 4, 1886) has also made it into bougies with cocoanut oil for cases of gonorrhœa and gleet, and as an ointment with lard (1 to 3) for indolent ulcers. In fact, it may be used with success in all cases where iodoform is indicated. It is non-poisonous, and is eliminated from the system as iodine. Dr. Wolf has found from his experiments made on rabbits that a ten per cent. solution in oil produced no irritation. Drs. Mazzoni and Rocci have employed it over two hundred times.

In venereal affections (chancres, adenitis, and periadenitis) it was used with the best results. The venereal sore having been washed with water, and carefully dried, was sprinkled over with iodol powder, and covered with silk protective; if the chancre was large and very purulent, Brun's wool was also employed; this dressing was repeated every twenty-four hours. After the dressing had been renewed from four to six times, the base of the chancre commenced to granulate, and the edges showed a tendency to cicatrize; no fresh ulcerations, nor any adenitis in the inguinal region, ever appeared, and even commencing inflammation of the lymphatic glands (in two cases) subsided without any special treatment.

In patients who came with wounds which had large openings, with thinned, undermined, and blue edges, the free incisions which are recommended in such cases should be avoided, and the surface of the sore simply sprinkled with iodol powder. In twenty-four hours a change was noticeable in the character and quantity of the secretion. The ulcer was cleansed with Brun's wool, and, after the dressing had been renewed three or four times, it commenced to granulate, and showed a tendency to rapid cicatrization.

In ulcers where there is very marked necrobiosis, the good effect of iodol is very remarkable,—the foul smell disappears, the secretion diminishes, and the ulcer changes in a short time to a healthy granulating wound. In atonic ulcers also the result was likewise favorable: even after two applications a distinct improvement was to be observed. On the other hand, iodol was quite ineffectual in sloughing ulcers where there were marked sloughs; in these cases its use had to be discontinued, since not only did no improvement ensue, but the disease extended. The cause of this seemed to be that the iodol in such cases is washed away by the fluids which are secreted in such quantity, and that in employing alcoholic solutions the iodol is precipitated and then carried away.

As regards the principle of the action of iodol, it is probable that, as in the case of iodoform, very small amounts of iodine are constantly being liberated at the place where it is applied, and that on this the local therapeutic effect of the remedy depends. The nascent condition of the iodine seems to render possible the further combinations to form iodide of potassium and iodide albuminate, under which condition it is absorbed. The liberation of the iodide from iodol, especially when this is in the form of iodol gauze, may be more certain than in the case of iodoform. Iodol gauze dressings show, after remaining on for a single day, a distinct separation of iodine in the gauze, and also a marked brown coloration in the neighborhood of the wound; very probably this liberation of iodine is occasioned by the warmth of the body, though possibly also by a fermentation occasioned by the secretions from the wound. That the former plays a part may be seen from the fact that iodine is liberated when iodol gauze is

heated in a test-tube, and also a development of iodine may be observed in the gauze when it is kept at a temperature of 39° C. for twenty-four hours on a water-bath.

Although iodol is far from being perfection as an antiseptic,—for on account of its very slight solubility in water, 1 in 500, and also on account of its present high price, many would prefer another drug,—nevertheless we cannot refuse to admit the great advantages of its mildness of action, its power of deodorizing secretions, the absence of the formation of crusts, and its being almost completely free from odor. The greatest advantage would also accrue if, in addition, its employment should be unattended with any poisonous results.

Like most medicinal agents, iodol has been recommended as a local application to cancer, especially uterine, and as a powder it has been insufflated on the diseased surface, and its glycerin alcohol has been painted over the carcinoma.

ICHTHYOL IN CHRONIC URTICARIA.

We abstract from the *Wiener Medicinische Blätter* of August 5, 1886, the following therapeutic note regarding ichthyol:

According to UNNA, we possess in the salicylate of sodium and in atropine two remedies against chronic urticaria, which are ordinarily wholly reliable. Still, there are cases in which not only these drugs but the entire host of nervines fail, and ichthyol alone brings relief and cure. The following two cases may serve to illustrate this fact:

1. Miss S., æt. 22, chlorotic; presented for treatment March, 1885, for an extended urticaria, existing four weeks. Salicylate of sodium was given in the largest doses for several days without the slightest benefit. Atropine internally (0.0005 *ter die*), painting with equal parts of spir. saponat. and tinctur. bellad., decoction of valerian, and iron pills brought on an improvement, which, however, soon disappeared again. Ichthyol (pure) taken in 5-drop doses three times daily, and applied also externally, established a perfect and lasting cure.

2. Vigorous man; treated by other physicians without success for an urticaria of several weeks' standing. Unna prescribed ichthyol, to be employed internally and externally, and again effected a perfect cure.

In neither case did any relapse appear.

THE ACTION OF URETHAN.

DR. EMILE KRÆPELIN contributes an article to the *Neurologisches Centralblatt* (March 1) on the action of urethan. The reports on this hypnotic have up to the present been uniformly favorable. Kræpelin's experience has been of a like character. He has given the drug in about two hundred instances. Most of his cases were cases of insanity, but thirty-four instances of various other diseases were included. The dose ranged, as a rule, from 1 to 3 grammes; occasionally a dose of from 4 to 5 grammes was given. No unpleasant effect on the heart or nervous system, either during the action of the drug or afterwards, was ever noticed. In one case of alcoholic gastric catarrh, vomiting was produced by the larger dose. The appetite, however, was never in the smallest degree impaired, even by the continuous use of the drug for several weeks. Urethan acts as a genuine hypnotic. Ten or fifteen minutes after taking it a quiet sleep comes on, which lasts for several hours, and from which the patient wakes up without any unpleasant feeling about the head. Should the sleep be interrupted by any external cause, the patient generally falls off to sleep again as soon as the disturbance is removed. The certainty of the drug's action depends upon the cause of the sleeplessness, and on the dose. It is not a hypnotic of great energy, and in cases of great excitement it is of little value. In such cases it is far inferior to paraldehyde. In delirium tremens, especially, it failed. Perhaps, however, if larger doses were given in these cases, the result might have been more satisfactory. For the relief of pain the author does not consider it of any use whatever. In cases of phthisis the combination of a small quantity of morphine was found useful. When given in doses of 1 gramme, it acted sufficiently in fifty-four per cent. When the dose was 3 grammes, the result was favorable in seventy per cent. The form of mental ailment, in most cases, was general paralysis or melancholia. In the excited stages of general paralysis, small doses were frequently altogether without effect. The larger doses in such cases gave a satisfactory result in sixty per cent. of the cases. In the higher degrees of excitement, in mania, for example, as well as in delirium tremens, the author found himself obliged to have recourse to paraldehyde. In melancholia the drug gave better results; it secured quiet sleep in seventy-seven per cent. The patients were all women, and many of them were very anæmic. Among the most

favorable indications for urethan the author places exhausting diseases, feverishness, and lowered nutrition. One great advantage which this drug has over paraldehyde is that it is not so unpleasant to the smell or taste, and it can, if necessary, be taken in simple solution without any flavoring or disguising agent.—*Brit. Med. Journ.*, September 4, 1886.

RHUS RADICANS.

SEÑOR FERNANDO ALTARNIRANDO, writing in the Mexican journal *El Observador Medico* on a plant called locally the Guau or the Mala Mujer, the scientific name of which is Rhus radicans, states that its active principle is of a peculiarly volatile nature, and relates the case of a man who, after collecting and cutting the plant up, complained of chills and a feeling of extreme fatigue, and subsequently developed a rash, at first erythematous, and afterwards pustular, affecting chiefly the groins, axillæ, and other parts where the sudorific glands are most numerous. The action of the exhalation from the plant could not well have been direct, as the parts chiefly affected were covered with clothes, and so the writer suggests that the active principle must have entered by the respiratory passages, being then carried by the blood to the skin, where its action became manifest. He advises that preparations of the drug should be made from the freshly-cut plant and its juice, and that all the collecting should be done before sunrise. The tincture might be made use of, but the extract must necessarily be inactive, as, indeed, it has proved itself, having been experimented on by Dr. Dominguez. In case of accidental poisoning, such as in the patient mentioned, the indications would be to produce diaphoresis, and to maintain the skin in a state of moisture. In order to prevent toxic effects, those who gather or manipulate the plant should be careful not to breathe the air which has passed over it, but should keep to windward of it.—*Lancet*, July 27, 1886.

THE VALUE OF RESORCIN, ICHTHYOL, AND LANOLIN IN CUTANEOUS DISEASES.

At the recent meeting of the American Dermatological Association, DR. H. W. STELWAGON, of Philadelphia (*Boston Med. and Surgical Journal*, September 16, 1886), read a paper with the above title, of which the following represents his most important conclusions:

Resorcin in eczema is rarely of benefit, but possesses some power over the itching. For this purpose a six per cent. ointment is useful. In greater strength it is irritating. In tinea sycosis it has proven of some value in ten to twenty per cent. strength. In tinea tonsurans, it is inferior to the remedies usually employed. In one case of leg ulcer healing took place under its use. In a second case, no effect was produced. In seborrhœa and alopecia dependent upon this disease, a lotion, consisting of a drachm of resorcin, one or two drachms of castor oil, five minims of Peruvian balsam, and four ounces of alcohol, was of value. In tinea versicolor it was found less useful than a solution of hypophosphite of sodium. In psoriasis and in one case of lupus erythematosus, the result was negative. In one case of superficial epithelioma, a fifty per cent. ointment produced a good result. In a second case, a fair result was obtained, and in a third the result was negative. In a case of favus, a twenty-five per cent. ointment used two months produced no decided effect.

Ichthyol.—In a small proportion of cases of rosacea and acne vulgaris a ten to twenty per cent. preparation was found beneficial. In eczema it was valueless and usually irritating. In furunculus it acted with good results in three cases, when applied as a twenty per cent. plaster. In the fourth case it had no effect. It was of service in psoriasis, and also in a case of lupus erythematosus. In favus it was used without effect.

Lanolin.—In some cases as an ointment base this is superior to the ordinary fats in use. Where a simple protective action is desired, it is inferior to vaseline, cold cream, or lard. In chronic cases, where there is infiltration, and a degree of penetration is the object, lanolin is especially valuable. The writer stated that, according to Liebreich, a *lanolinum purissimum* was now manufactured, in which the cholesterin ethers were absent. The main disadvantage of lanolin, as now manufactured from sheep's wool, is its strong sheepy odor. In a few acute and subacute cases of eczema, lanolin, for some reason, proved irritating. As a rule, however, it is bland and unirritating.

COCAINE IN THE TREATMENT OF GONORRHŒAL OPHTHALMIA.

MR. A. LEAHY reports in the *Indian Medical Gazette*, July, 1886) two cases of gonorrhœal ophthalmia, in both of which the greatest benefit was derived from the local

application of cocaine. As is well known, in gonorrhœal ophthalmia it is of primary importance to lessen the inflammation rapidly, to relieve the intense congestion of the conjunctival vessels and reduce chemosis, and by so doing prevent ulceration and sloughing of the cornea. Last, but not least, is the relief of the ocular and circumorbital pain, which, by its persistence, greatly depresses the patient, and prevents sleep. Mr. Leahy employed a mixture composed of ½ grain of sulphate of atropine, and 4 grains of sulphate of cocaine incorporated with 100 grains of vaseline. This mixture was introduced beneath the upper eyelids, and after three days' treatment the chemosis rapidly became less, the discharge diminished in quantity, the pain completely disappeared, and the cornea, which had been hidden by the chemosis, became visible.

LIGATION OF THE VERTEBRAL ARTERIES FOR THE RELIEF OR CURE OF EPILEPSY.

The question of the value of surgical interference in the treatment of epilepsy is one that has never been fully settled. It is true that where depressed bone is found as the cause of the epilepsy, no one at the present time questions the necessity of relieving the pressure, but the operation of ligating one or more of the large vessels furnishing blood to the brain for the relief or cure of epilepsy is a procedure concerning which opinions are at present at wide variance. But few cases have been reported where this operation has been performed for epilepsy, so that as yet scarcely any sufficient and reliable conclusions can be drawn. From a study of these cases, however, Dr. J. L. Gray thinks that the following conclusions are warranted (*Neurol. Review*, July, 1886):

1. Ligation of the vertebral arteries should take its place as a recognized procedure in the treatment of certain cases of epilepsy.

2. The operation should be confined to those cases in which the exciting causes of the attacks come from some region outside the brain.

3. The arteries should be tied as high up as practicable, and the ligature should include all the fibres of the sympathetic accompanying the vessel.

4. Where the side of the brain which is first invaded by the disease can be determined, the artery of that side should be ligated.

5. Where the invasion of the disease is apparently bilateral, both vertebrals should be ligated.

6. This operation should not be done as a substitute, but as an aid to other forms of treatment for the relief or cure of epilepsy.

COLD APPLICATIONS TO THE PRÆCORDIA IN FEVER.

In the *Practitioner* (August, 1886) Dr. F. T. Grigorovich publishes the results of this mode of treatment of fever employed in the Rostoff Military Hospital. His observations were made on uncomplicated cases of typhoid fever. He finds that the respiration, at first somewhat quickened and rendered irregular by the reflex actions, subsequently becomes slower. At the end of the application of the ice and the next morning it is deeper and more regular, but somewhat slower than before the ice was applied.

The general conclusions regarding the effect of applying cold to the region of the heart are as follows:

1. The cold undoubtedly reaches the heart itself, and thus produces an effect on its action.

2. This effect is particularly noticeable when the cardiac beats are increased in frequency in consequence of a high temperature quickly attained, and where a certain degree of sensitiveness to a high temperature exists.

3. The effect of cold is not marked at the end of a prolonged attack of fever, pathological changes having by that time probably become established in the cardiac muscle.

4. The local application of cold is only capable of protecting the heart-muscle from the effects of a high temperature when it is applied assiduously from the commencement of the disease.

5. Under its influence the action of the heart improves, the number of beats diminishes, while their force and amplitude increase.

6. Cold applied to the region of the heart diminishes the gravity of the *typhoid* condition and favorably influences the respiration.

7. With regard to the effect of cold applied to the region of the heart on the course of the general temperature, the author cannot at present express a decided opinion, as he did not investigate the question; but in the results which he obtained indications may be found of the possibility of its causing some diminution of the temperature.

A NEW METHOD FOR THE DETECTION OF HYALINE CASTS.

Dr. S. E. Armstrong, of Passaic, N. J., sends to the *New York Medical Record*, September 4, 1886, a description of a method of manipulation devised by him to facilitate the detection of hyaline casts in the urine. He calls attention to the value of these casts from a diagnostic point of view, since the presence of albumen alone is no certain evidence of the existence of nephritis, and its absence does not necessarily imply a healthy state of the kidneys. He writes: "The hyaline cast may be said to form the stroma of all other varieties,—the oily, epithelial, granular, etc. It is always found in some of the different stages of any of the forms of Bright's disease, particularly in the first stage, when a recognition of the trouble is most to be desired. The propriety of making a positive diagnosis on the strength of this one sign may justly be questioned, but there are usually other symptoms, objective or subjective, to aid us. Of course the use of the microscope in the search for hyaline casts is an absolute necessity. Two methods are usually taught, viz., staining and tilting the mirror. The first I regard as impracticable, because it involves too much trouble; the second because it is unreliable. I have never been able to make the desired success of either, though I must confess that I have not frequently tried the former. There is another method which comes to me in the nature of a discovery. Others may have known of it for years. I have not been able to find a description of it in the books, although it may be there. Briefly, it consists in preparing the specimen in the usual way, between a plain slide and cover-glass. Then placing the slide in position and adjusting the focus, the observer, with his eye at the instrument, presses the cover-glass down with a thumb on either side of the objective, and then, the slide being held firmly by the clips, pushes the cover-glass a little bit forward and back. By this means he has the advantage of *looking for an object in motion;* also, a cast, if present, is made to pass, rotating on its long axis, through different planes of the fluid, *hence through different possible foci.* By this means alone it is almost sure to be discovered. But there is still another advantage in this method, viz., as the cast revolves through the liquid it gathers on, perhaps, amorphous urates, vibriones, or whatever minute object it comes in contact with, and is thus brought out into bold relief. Of course we must by previous examination exclude granular casts, otherwise, *after* manipulation, we may be puzzled to tell which variety we have discovered; we must also be sure we have not rolled out a white blood- or pus-corpuscle, so that it misleads us into the belief that we have found a short one of either one or the other variety. Prolonged manipulation is neither necessary nor advisable."

SUBLIMATE INJECTIONS IN GONORRHŒAL CYSTITIS.

The history of an obstinate case of gleet and cystitis is given in *El Dictamen* by Señor Garcia Andradas, which, after being treated unsuccessfully by means of injections of nitrate of silver, yielded very quickly to injections of corrosive sublimate. The patient, who was a river fisherman, contracted gonorrhœa, which was treated for a month with balsams and astringent injections. The discharge then became serous, and exquisitely painful vesical tenesmus supervened, the calls to urinate being so frequent as to give the man no rest. An attempt to pass an instrument occasioned the greatest agony when it came in contact with the prostatic portion of the urethra. The diagnosis made was that of acute prostato-cystitis consequent on gonorrhœa, and so the local application of a sublimate solution appeared to be the most rational treatment, as it had in the author's hands proved very beneficial in cases of subacute cystitis due to the same cause; but it was thought well to try first Guyon's treatment. With great difficulty, owing to the extreme sensitiveness of the urethra, an elastic catheter was passed to the prostatic portion, and ten grammes (160 gtt.) of a one per cent. solution of nitrate of silver injected. A few minutes afterwards urine was passed with great pain, so a warm bath and an opiate were ordered, which gave only temporary relief, the opium having to be repeated at night. The next day the patient's condition was the same as it had been before the injection. Three or four days afterwards a similar injection was given, with no better result. Four days later, as there was no improvement, the use of sublimate injections was commenced. The catheter was passed as far as the prostate, and forty-five grammes of a two per mille solution of sublimate in warm water were injected. This the patient was compelled to retain for three minutes; the subsequent micturition was very painful, but at night he was able to rest, and retained his urine for three hours. The next day the

urine was less turbid, and it was voided less frequently. His condition continued to improve for three days, when a second sublimate injection was given of double the quantity of solution. This occasioned some pain, but it quickly passed off, and the patient was able to rest. In four days' time he requested to be discharged, as his urine was clear, and he had no pain on micturition. Thus, the author remarks, two injections sufficed to cure completely an affection usually most obnoxious to treatment of an ordinary kind. The superiority of sublimate injections has shown itself in several cases of a somewhat analogous character in which he has employed it. These he proposes to publish and discuss on some future occasion.—*Lancet*, August 21, 1886.

ACORN COCOA IN THE TREATMENT OF DIARRHŒA AND VOMITING IN CHILDREN.

Acorn cocoa is a preparation of ordinary cocoa powdered and freed from fat, to which are added the soluble parts of roasted acorns without cellulose, and a little sugar and roasted flour. Liebreich suggested this combination, and that it should be tried in the treatment of diarrhœa and vomiting of children, and it was found that of one hundred and two cases of diarrhœa with vomiting six only died, and the remainder recovered in from one to eight days. This combination is now manufactured as a substitute for tea, coffee, or cocoa, and is refreshing, tasty, and nutritive even for adults. Dr. F. W. Elsner (*Australasian Med. Gazette*, June, 1886) has also had a considerable experience with this remedy in this class of cases, and has obtained marked success by its use. His mode of administration was to mix a teaspoonful of it with cold water in a small cup, and then to boil it, constantly stirring, and this quantity is administered thrice daily by means of a spoon or feeding-cup. All other food and medicine is prohibited, and the quantity may be gradually reduced. Dr. Elsner has notes of twenty cases of continuous and exhausting diarrhœa with persistent vomiting, which had continued for three weeks in two cases and for shorter periods in the others. In half the cases various remedies had been employed before the acorn cocoa was administered; in the others, however, it was the first drug given, and its effect was rapid and complete in each instance, and it never took more than two days to bring about improvement, while twelve days was the outside at which a complete cure was effected.

PIPERINE IN INTERMITTENT FEVER.

Dr. C. S. Taylor reports in the *British Medical Journal*, September 4, 1886, two cases of intermittent fever which were treated by the administration of 3 grains of piperine every hour until 18 grains had been taken, as soon as perspiration commenced to follow the malarial paroxysm. On the following day, when the intermission was complete, the same quantity was directed to be taken every three hours. According to Dr. Taylor, this treatment in every case succeeded in checking the paroxysm. As soon as this is accomplished, he advises the use of the following pill, whose employment has always seemed to be very beneficial:

℞ Blue mass, gr. 1;
Piperine, gr. 2;
Sulphate of quinine, gr. 3;
Syrup, q.s.

Reviews.

Studies in Pathological Anatomy. By Francis Delafield, M.D. Vol. II., Part 2.
New York: William Wood & Co., 1886.

The above issue of Dr. Delafield's Studies contains descriptions and plates of chronic pulmonary phthisis and lobar pneumonia.

In regard to the nature of chronic phthisis, Dr. Delafield gives his opinion in very positive and unmistakable terms. He writes, "The one essential feature of chronic phthisis is the presence of tubercular inflammation; without this there is no phthisis. Such a tubercular inflammation is not only an essential but also a primary part of chronic phthisis; it exists from the very commencement of the disease. Phthisis is not an ordinary form of chronic inflammation of the lung, to which tubercles may or may not be added; it is primarily a tubercular affection." While tubercular inflammation is considered the essential and primary lesion of chronic phthisis by Dr. Delafield, he, however, admits that it may be very slight, or so changed by age, or other forms of inflammation may be so developed, as to obscure the tubercular character of the lesion. No doubt the confusion which exists in regard to the nature of this disease is in a great measure owing to the many complications that may arise during the progress of the disease. Notwithstanding some doubt

may exist in reference to the exact nature of the affection, it is gratifying to be assured by Dr. Delafield that "the lesions, the symptoms, and the treatment of chronic phthisis often depends much more upon the associated inflammations than upon the phthisis." The tubercle-bacilli are mentioned as being "regularly found associated with the lesions of chronic phthisis." The rôle played by these organisms, whether they are the cause or simply a result of the tubercular inflammation, is not here discussed by Dr. Delafield.

The different lesions which may be associated with chronic phthisis are represented by twenty-two drawings. Diffused hepatization of the lung is pictured in its various stages by nine drawings. This lesion is said to consist in the inflammatory products which fill the air-spaces, or by the growth of tissue in the walls of the air-spaces, or by a combination of both these conditions.

The morbid changes which are met with in the larynx, trachea, and bronchi in chronic phthisis, are illustrated by eleven drawings. Three drawings are given of the miliary tubercle, which is believed by Dr. Delafield to be always present in chronic phthisis, and also that it presents the same characters as the miliary tubercle which is observed in acute phthisis and in chronic miliary tuberculosis. Four drawings representing a rare form of lobar pneumonia are given. This special lesion is said to be "characterized by the production of new connective tissue within the cavities of the air-spaces a few days after the invasion of the inflammatory process." That organized tissue may be found in cases of lobar pneumonia which have been chronic in their course has been pointed out by a number of observers, but the cases given by Dr. Delafield are acute in their nature, and the pathological changes found after death differ from those met with in ordinary lobar pneumonia in that the exudation into the air-spaces takes on immediate organization, instead of following the usual course of later becoming connective tissue or being absorbed.

The drawings which illustrate Dr. Delafield's work are, as in the previous volume, made with high magnifying power, and therefore appear truly gigantic. Whether there is any advantage gained by the employment of such high power in studying ordinary pathological lesions is an undecided question with us. No doubt there is much minute detail still to be studied out in the histological elements of most pathological changes, but an examination of the drawings of Dr. Delafield does not teach us any new arrangement of structure, since a comparison of his pictures with those of other illustrators, who have not used such high power, shows an exact resemblance between them. The author, however, has drawn faithful and most beautiful illustrations. Such work cannot but aid in the study of pathological changes, and we hope the "Studies in Pathological Anatomy" will continue to appear. J. H. C. S.

Correspondence.

LONDON.

(From our Special Correspondent.)

The event that has been exercising the professional mind in England during the last few weeks is of course the annual meeting of the British Medical Association at Brighton. As one of your most worthy representatives happily and forcibly puts it, the specialization of the medicine of to-day demands co-operation: it is only by co-operation and association that the centrifugal elements of medical science, as they are now pursued, can be made to take a centripetal course at periodical intervals, and thus true inductive advance secured. Some of us may be of opinion that this very sound principle is carried too far, or even sacrificed, when association is made to take the shape of "collective investigation," for individuality is then sunk, and the observer becomes the slave of a committee, who demand the formulation of experience and opinion under a few cut-and-dried heads of their own choosing. In this country medical science, like our medical institutions, has been mainly supported by "voluntary contributions," and collective investigation does not appear to be in a very thriving condition at the present time. But it is quite a different matter that men should meet periodically and submit to mutual discussion the problems that have been holding their attention during the interval. It is good, too, that some of our aspiring juniors should have an occasional opportunity of raising their voices, premature though some of the conclusions may be which they air upon the platform. Nor must we forget the overworked practitioner, who welcomes his annual "outing," this relief from harassing work, this occasion for meeting old friends and of enjoying some social dissipation of a very innocent kind.

Brighton was the meeting-place this year, as I have said. Your readers, remote though

most of them be from the Sussex coast, have all heard of the queen of English watering-places. Few towns present greater attractions of a kind, especially to country associates, who would enjoy the keenest air in England, the brilliant sea, the gay crowds on pier and parade, and the many successful efforts to afford them pleasure in the way of dinners and balls, which a fashionable place like Brighton affords. I trust our foreign friends were equally satisfied. For ourselves, we, who live in the metropolis, do not as a rule take kindly to Brighton: it is too London-like to afford us the kind of change which our brains require. I need hardly add that the hospitality of our Brighton *confrères* was hearty and universal, and that all of us welcomed our visitors from America and the Continent. Among the members of the profession from your side of the Atlantic were Dr. Nathan S. Davis, of Chicago; Dr. Billings, of Washington; Dr. Grant, of Ottawa; Mr. Kingston, of Montreal; Dr. Shoemaker, of Philadelphia; Dr. Blake, lately of California; Dr. W. Brodie, of Detroit; Dr. Covernton, of Toronto; Dr. Pancoast, of Philadelphia, and many more. France sent us two worthy representatives in the persons of Brown-Séquard and Charcot; and German pharmacology had a splendid exponent in Oscar Liebreich.

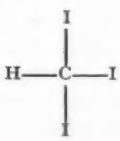
I will not dwell upon the great "set" addresses, nor on the remarks with which the presidents of the various sections opened the work in their several departments. I must, however, refer to Dr. Billings's most able and original oration in "Medicine," which was so eagerly anticipated that it certainly of itself attracted some of the members from a distance. Dr. Billings's address was constructed with a literary skill, and given with a character and force which delighted his audience. It did more than this, however. It opened our eyes on this side to the vastness of the movement which is going forward with you in the States; to the rare and unique opportunities which you possess of studying certain great disease problems with respect to racial and other factors; and to the glorious future that your profession has before them, when medical education and medical legislation shall have become more advanced.

Dr. Broadbent's opening address in the Section of Medicine on the "Remote Effects of Remedies," was worthy of a man who is fast rising into the very first rank of London consultants. It was essentially the outcome of ripening experience,—an experience gained by laborious observation and a far-seeing but carefully-tempered philosophical mind. Instead of joining in the cry against treatment, which is only too fashionable with us at present, Dr. Broadbent devoted his most recent deliverance to the abuse of useful remedies,—to the evil effects which frequently flow from the ill-considered application of treatment, whether medicinal or dietetic, to purchase present relief regardless of future consequences. The science of therapeutics can only profit by such a timely outspoken warning; for therapeutics suffers as much from the contempt brought upon useful methods by their indiscriminate use as from the studied neglect which it receives at the hands of its direct opponents. What could be nearer the truth than these remarks of Dr. Broadbent's upon a vaunted class of remedies for asthma, which we owe to the United States, and of which "Nimrod's cure" is the type: "The bronchial spasm may be met by a remedy which satisfies the demand for a local stimulant or sedative; but the solanaceous drugs, of which the powders are largely composed, contain powerful alkaloids, which obtain direct access to the blood through the pulmonary capillaries, and produce their effects on the nervous and vascular systems; and when you see the stupefied mental condition and the congested face and eyes, and note the large, weak, sluggish pulse, showing paralysis of the arterial walls, it is clear that such effects cannot be indefinitely repeated with impunity. It is where there has been a catarrhal element in the asthma that the results have seemed to me most disastrous. The right ventricle loses its tone like the muscular coats of the arteries, and instead of becoming hypertrophied, yields to the resistance in the pulmonary circulation and is dilated, finally giving rise to systemic venous stasis and dropsy." Again, it would be well for some of our West End physicians to read these words on dieting and carefully weigh them: "Numbers of people, especially women, who suffer from pain in the epigastrium after meals, attribute the discomfort to some particular article of diet. It is not uncommon for the medical man to take the same view of the case, and a scale of diet is laid down with great minuteness, adopting all the sufferer's restrictions, and perhaps adding more. This may be done even when neuralgia is crying aloud for more and better blood to be sent to the nerve-centres. There is still discomfort and a sense of repletion after food, and the patient improves upon his instructions until

the starvation point is reached. The energetic wife and mother becomes a fretful invalid, and neuroses are developed unless acute illness supervene, during which liberal nourishment is insisted on. In all such cases it is not the food that disagrees with the stomach, but the stomach which disagrees with the food, and the proper treatment is not levelling down the nourishment to the digestive capacity of the stomach, but the bringing up of the functional energy of the stomach to the requirements of digestion by extra food of a stimulating character, by stimulants at meals, or by tonics."

Besides these subjects, Dr. Broadbent took up the evil remote effects of the habitual use of colchicum and other specifics in gout, the misapplication of the "Banting" process, and the heroic treatment of migraine, and dealt with them in words which are not likely to be lost.

But I must come to the Section of Therapeutics, in which the editors and readers of the GAZETTE will feel a special interest. The Section of Pharmacology and Therapeutics at the British Medical Association meetings is of but recent development, but it is already a thriving youngster. Along with the Section of Pathology it has relieved medicine somewhat of the crowd of papers annually presented for discussion. This year it met under the able and genial presidency of Dr. Lauder Brunton, the most prominent representative of therapeutical science south of the Tweed. Dr. Brunton's opening address was characteristic of the man. It was intended—and with complete success—not so much to adorn as to improve the occasion, to delight and charm less than to instruct his hearers. Which among us is not painfully conscious of the rapidity with which modern organic chemistry is marching away from us? We have struggled through one "notation" after another, and through more than one nomenclature; and all this only to find ourselves once more in the rear of chemical progress, which now appears to the uninitiated to be surely returning to cabalistic and alchemic symbols, when iodoform is represented by



and resorcin by an elaborate closed chain with lateral and terminal hooklets. Dr. Brunton sympathizes with our difficulty in all this, and has given us an account of the connection between chemical constitution and physiological action couched in terms so plain and popular,—so full of easy illustration, and so suggestive,—that a child almost might master the elements of the subject. If his argument were not so continuous, I would have quoted freely from Dr. Brunton's admirable address; but, as it is, I will only cite a few sentences on certain benefits that have quite recently accrued from the study of this subject, leaving your readers to peruse the original text on other pages. It occurred to Dr. Brunton and Dr. Cash, in the course of a series of experiments, that if they could saturate the body of an animal with potassium they should be able to render it proof against the poisonous action of barium. Having met with some success, Dr. Cash pursued this line of investigation much farther, and obtained results which, in Dr. Brunton's opinion, are "among the most extraordinary and the most promising in pharmacology." Knowing, as he did, that corrosive sublimate was an exceedingly poisonous disinfectant, it occurred to Dr. Cash that it might be more harmful to disease-germs than to the bodies of higher animals, and that he might be able, by the introduction of the poison into the body of an animal, to render it unsusceptible to zymotic diseases. A similar idea had occurred to Koch, who injected corrosive sublimate into animals after previously inoculating them with anthrax; but his experiments failed, while Cash has proved successful by introducing the corrosive sublimate before inoculating with anthrax, and thus giving the drug the start of the disease. "These experiments," said Dr. Brunton, "acquire an additional interest from the fact that M. Pasteur, although uncertain regarding the exact mode in which his process of inoculation for hydrophobia has brought about such satisfactory results, is disposed to think that the agent which prevents the disease is a chemical substance and not a microbe."

The place of honor among the communications in the Therapeutical Section was very properly given to one by Liebreich, the discoverer of chloral, who read an important paper on lanolin, his new basis for ointments. Dr. Shoemaker, a recognized authority on the subject, took part in the debate. Two general discussions were well sustained,—the one on "Antipyretics," introduced by Dr. Carter, of Liverpool; the other, on "Analgesics," opened by Dr. Spender, of Bath. Among

the papers read were one by Dr. Shoemaker on "Hamamelis," which once more insisted on the value of the drug as a hæmostatic, spite of your own recent researches on its pharmacology; one by Dr. Blake, on the "Climate of California,"—a note of warning; the record of an investigation into the *modus operandi* of "Morphine in Diabetes," by Dr. Mitchell Bruce; and a preliminary communication by Dr. Semon and Mr. Horsley, on the "Action of Ether upon the Larynx."

August 21, 1886.

POTASSIUM PERMANGANATE IN AMENORRHŒA.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—In the June number of the GAZETTE you ask for experiences as to uses of potassium permanganate in amenorrhœa. I have used it in two simple cases uncomplicated by anæmia, *without result*, giving two grains thrice daily, after meals, for six weeks, and using also stimulating pediluvia, and in one case local faradization of uterus for four weeks, three times weekly. In a third case I used it three weeks without any result in the same dose, and then resorting to other remedies for four weeks, the patient came all right.

My conclusion from this experience is that it is not so valuable a remedy in amenorrhœa as we have been led to expect.

Yours very respectfully,

J. N. TILDEN, M.D.

PEEKSKILL-ON-HUDSON.

THE ANÆSTHETIC REVELATION.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—Allow me to recall attention to the article in your issue of August 16 by Dr. Shoemaker, entitled "Recollections after Ether-Inhalation." The paper is memorable in the interest of the topic and the guarded and conscientious spirit of its treatment; for what should have more interest, even for practical minds, than the fact, there repeated, that in so simple and easy an experiment as ether-inhalation the primordial mystery of being may be appreciated? and what should be more hopeful for the advantage of whatever of science may be involved than the fact of the experience being related by manifest gentlemen, whose tone carries conviction of reliability?

The illumination or insight to which that article refers has been usual with me for twenty-five years. I published an account of it in 1874 in a pamphlet of thirty-two pages, of which I distributed one thousand copies gratuitously, and have never allowed it to be sold, nor any money to be made out of it by any one. My work had some attention, and elicited many communications, among them a remarkable letter from Alfred Tennyson, giving normal experiences of "a kind of trance to which he had been subject quite up from boyhood." This letter is even now, within a month, republished in English papers; and the topic of your article is an ordinary one to a very extensive circle both here and abroad, mainly of scientists of the order of speculative philosophy. The topic was considerably treated in *Mind*, the London metaphysical magazine, by Dr. Wm. James, the eminent metaphysician of Harvard University, he there endeavoring to *express* the secret. In that circle I am usually regarded as having first signalized the anæsthetic revelation as somewhat reliable and uniform in the experience of intellectual men; indeed, I published my work avowedly only for fear that the secret—that is, its apprehensibility—should die with me. Not but that thousands had experienced the insight, but that up to that time no one had publicly claimed it and demanded its uniform expectation. It will seem a very small matter to me to find myself mistaking the originality of so accidental a discovery, yet the discovery was treated as mine by the reviewers of that year. It is of much more interest and importance to me to have what was a lonesome secret to me for fourteen years confirmed as a homologous insight of the race, and seeking expression of its mystery whenever it appears to such as have appreciation of the difference between knowledge and mystery in our present stage of advancement.

But the general reader will be apt to lose patience with these extraneous considerations, and to demand the secret itself. It is but rational in any man, hearing the claim of a revelation, to expect to be told what it is. But here the race is wholly at fault as yet; for the secret clings to the condition, and is precisely that which philosophy has sought as abstract truth through all the history of thought. We can give the style and region of it, what it is generally about, but we fail to express it so as to recall it normally, simply through lack of "divine philosophy." We have not understood it expressibly, for the same reasons that we have not understood expressi-

bly anything at all in the region of thought to which it belongs.

To this part of the subject, which is now the main part to the advanced experimenters, Dr. Shoemaker's article is only initiatory. He declares the experience, and locates it in thought,—that is, he says it is the mystery of existence, or, in his own good words, "the simplest expression or essential nature of human existence;" it was given him *as* a revelation; he "must remember all that occurred," etc. But the questions, What is it? and Why was the whole illumination swept inexorably away from him? will be asked in vain until the philosophy of Hegel is rectified. I think I follow Dr. Shoemaker very well in his account. Of what he means by *aural waves* I know very well, but I think I may speak for myself and many others a doubt that a repetition of the experience would prove his lines to be a competent illustration. The fact that was impressing him was probably this. Sanity—our ordinary tenor and participation of intelligence—is felt, in the revelation, to be only one accidental or arbitrary grade or degree of a kind of humming which the anæsthetic hastens; this pace quickens until we lose all distinction, and as we "come to," and the pace slackens, we perceive that this high state was as true sanity as we ever had, and we are astonished at finding, as we land on our terra firma, that sanity is only an accustomed grade, that might as well be either higher or lower. So, in a less degree, a man, exhilarated with intoxicating drink, feels that he is only at his best, and some have wondered why one might not be born with "three sheets in the wind." It is here that interest culminates in the experience; as a certain amount of liquor makes a "better man" of him in his own true consciousness, does the anæsthetic legitimately quicken the thought up to the appreciation of the divine but impersonal mystery? Is that really the difficulty of philosophy,—the grasp of the truth of being,—that we are not quite quick-witted enough, rather than organically barred out from it? and is the anæsthetic revelation philosophy's goal?

Long experience has taught me the way to this awful mystery in the normal condition. I can lie on my back in the still night, and go as near to it as my nerve will sustainingly permit. To go farther would demolish individuality; a side glimpse is enough for a mortal eye. And I know philosophically the reason of this dread. The truth of us and of all being is duplex. Philosophy had got so far with Hegel as to grasp the ancient saying that being and not being are equal, and halves of that reality which as a whole is being proper; but this whole could not be in time, and all dialectic involves a time process. The philosophical necessity was a new ontology, eliminating the element of time, and in which all things always are. This ontology is my claim to the attention of the hour.

I have gone as far as you can well accompany me as caterers to a "scientific" as distinguished from a metaphysical constituency. I may well wish that you would go farther; for all science, all absolute and radical explanation, is metaphysical; and in publishing the article of Dr. Shoemaker you essay positions which, however they may be "diagnosed" by physicians, as such, can be explained by metaphysicians alone. Referring facts to "law," "force," "designing mind," "divine power," and like generalities is no longer competent as for ultimate understanding.

If any of your readers care to follow my exegesis of the inevitable, they may consult the leading article of the last number of the *Journal of Speculative Philosophy* (D. Appleton & Co., New York, and Trübner & Co., London).

Much impressed by the tone and contents of the THERAPEUTIC GAZETTE, I trust earnestly in its success, and remain

Yours, with high regard,

BENJ. PAUL BLOOD.

AMSTERDAM, N. Y., August 31, 1886.

THE TREATMENT OF RHUS-POISONING.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—It is my fortune every season to see quite a goodly number of cases of rhus-poisoning, and I wish to emphasize a plan of treatment for this annoying trouble, already mentioned by Dr. Morrow in the *Journal of Cutaneous and Venereal Diseases*, and copied in the GAZETTE.

My treatment is simply a saturated solution of bicarbonate of sodium. I saturate strips of muslin in this solution, and apply them evenly over the surface, and then endeavor to keep the surface thoroughly moistened with the solution until the dermatitis subsides. I do not give any medicine internally. There is nothing new about this plan of treatment, but it has been entirely successful in my hands in every case.

FREDERICK W. PUTNAM, M.D.

BINGHAMTON, N. Y.

IVY-POISONING.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—I desire to call the attention of the medical profession to the specific action of the oil of sassafras in rhus-poisoning. I have used this remedy for many years in these cases, and have never known it to fail in any case. I generally have the oil rubbed well *all* over the parts affected twice daily. Many cases do not require the second application. I also let the patient have from 3 to 5 drops on a lump of sugar three times a day. I claim that this will cure "*all cases*," no matter at what stage used. I have used the oil with perfect success after bicarbonate of sodium, sulphate of zinc, sugar of lead, and other usual remedies have completely failed.

It will instantly relieve the pain from the sting of any insect,—bee, hornet, or spider. It should be given internally in bad cases. It will abort boils and carbuncles if given in from 5- to 10-drop doses three times a day. Try it and report.

A. J. ROE, M.D.

DECATUR, ILL.

IVY-POISONING.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—If you are not already supplied with an abundance of prescriptions for ivy-poisoning, you may publish the following, which I have used for fifteen years without a single failure:

℞ Sodæ sulphis, ℥i;
Acid. carbol., ℥iss;
Glycerin., ℥ii;
Aqua, ad q.s. ℥viii. M.
Ft. sol.

Sig.—Apply on cloths, keeping them constantly wet with the solution.

No other treatment is required.

J. F. WHITE, M.D.

COUNCIL BLUFFS, IOWA.

QUACKERY.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—I would like to add a few words towards agitating what I consider a most vital question to every member of the medical profession, introduced in the last number of the GAZETTE by J. Z. Scott, M.D., of Scandia, Kansas. I sincerely hope that his remarks will strike every reader of the GAZETTE as favorably as they have me, and that the question will be agitated until the profession at large are thoroughly aroused to the fact that our business is being filched from us, to a greater or less extent, by a lot of quacks and charlatans, who are flooding the country with their nefarious nostrums.

It is astonishing to me how the profession have sat still so long, and seen this business going on right under their eyes, and have never raised their voices against it. I think, as Dr. Scott does, it is time, and high time, that we do something in the way of protecting our business.

Just go into any drug-store and see the shelves loaded down with these quack and proprietary remedies, read the advertisements of many of these venders, giving the names of a score of disorders their medicines will cure, ending up with, "This wonderful remedy is now recommended and prescribed by the leading men of the medical profession all over the world." Is it any wonder that our profession has no dignity in it in this country?

It is *true* that in nine families out of ten the physician is only called as the last resort. The many thousands and thousands of dollars which go in to make the coffers of these men fat, who have never spent a half-dozen hours in the legitimate study of medicine, of a right belong to the men who have spent years of hard labor and many dollars to fit themselves for an honorable calling.

There is another gigantic evil that the minds of the profession ought to be directed to, and that is the squelching of itinerant quacks. It is perfectly marvellous the cheek some of these fellows exhibit.

The country is full of them. Listen. Dr. Schmoodinary (or some other outlandish name), of *fifty* years' experience, will be at the H—— Hotel at such a time, and has never failed to cure (naming a score of chronic diseases) *every* case that he has ever treated. Now, it is perfectly amazing to see the number, and among them quite intelligent people, who will flock to the answer of such an advertisement.

For example, an old clairvoyant woman came to this town some eight or nine months ago, claiming, as they all do, that in a semi-conscious state she could look all through the human body, and was thus able to prescribe just what the sufferer must have to effect a cure.

The fact is, she took out more money during her eight or nine visits here than any honest physician could get in a year. Now, my brethren, these things ought not to be.

We must protect ourselves, and in so doing we will protect the poor and ignorant, who so readily fall a prey to these vultures.

I would like to say something in regard to how the Legislature of the State of Wisconsin have treated the medical profession, if time and space would allow.

Petition after petition has gone in to them, with hundreds of names signed to them, asking them to pass some law to protect our calling, and to say whether men who had not in their possession a legal diploma should be allowed to practise medicine, but all to little or no avail.

If we have no rights that the people are bound to respect, then, in heaven's name, let us do something for ourselves. Will the editor of the GAZETTE please express his opinion on this subject?

Yours respectfully,

F. T. FIELD, M.D.

ELROY, WIS.

DERMATITIS VENENATA.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—The last two issues of the GAZETTE contain several articles upon dermatitis venenata, its cause and treatment, which have been of much interest to me. One point, however, was overlooked, or may not have occurred to the writers: that is, what appears to be a chronic or periodical form. Vol. x., No. 7, p. 492, article from *Journal of Cutaneous and Venereal Diseases*, the author says, "It has a tendency to a spontaneous cure, and is self-limited." In the majority of cases it does, but now and then a case turns up that, "despite" the treatment, has a way of its own. For instance, a case I have under treatment.

T. P., age 20; clerk. June 8 came to me for treatment. Face, neck, and arms affected. The disease yielded promptly to local application of

℞ Bismuth. subnit., ʒii;
Sweet cream, ʒi. M.
To be applied as often as required to allay burning.

June 26 he again presented himself for treatment. Condition same as before. Ordered same recipe as before. Now during the interval between the two attacks he had not been out of town, nor had he been exposed to the poison that he was aware of. He also informed me that he had been subject to it during the last seven years, that it usually broke out on him during the spring, occurring every three or four weeks, but that occasionally he would be attacked with it during the fall and winter. He called to see me last January for treatment for the same disease, but I was away at the time, and did not see him again until June 8, as he was only out on a visit to this place at the time. His case may be an exceptional one, or his susceptibility to the poison is so great that the mere contact with any substance that may have been in contact with the rhus will produce it upon him.

Where the bismuth and cream fail to effect a cure, I find the internal administration of a few doses of Fowler's solution and iodide of potassium combined very beneficial. Patients sometimes object to the use of bismuth on account of its turning black after a few hours exposure to air and light, and the bother of mixing it up every time it has to be applied, but the cooling effect the cream has suffices for the trouble, and the apparent curative effect of the bismuth suffices for its blackness.

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Notes and Queries.

AN EASY METHOD OF DISTINGUISHING THE SOLUTIONS OF CARBOLIC ACID USED IN SURGERY.

Carbolic acid still maintains a prominent position in the list of antiseptics for general surgical purposes. DR. MATTHEW HAY (*Lancet*, August 7, 1886) gives us a ready method of determining the strength of these solutions. The two strengths of the solution of carbolic acid in common use among those who practise antiseptic surgery are, as every one knows, one of the acid in twenty parts of water (or a five per cent. solution), and one in forty parts (or a two and one-half per cent. solution). These solutions are used for somewhat different purposes, and it is generally of some importance that the one should not be substituted for the other, the more so, as carbolic acid is not a very powerful antiseptic, and moderate dilution of it annuls its action. Now, as labels will drop off occasionally, or even the apothecary may supply by accident the weaker instead of the stronger solution, it may be sometimes desirable to be able to readily distinguish the solutions. The reagent which Dr. Hay proposes for the distinction of the solution is a saturated solution of chloride of sodium. If such a solution is added in about equal quantity to a five per cent. solution of pure crystalline carbolic acid, the

mixture becomes milky and opalescent, and the milkiness does not disappear on shaking; whereas, if added to a two and one-half per cent. solution, the mixture remains perfectly clear. The opalescence is due to the separation of carbolic acid in the form of minute drops. Chloride of sodium has a greater affinity for water than carbolic acid has, hence it is capable of displacing carbolic acid from its solution. This happens, however, only when the solution of carbolic acid is of sufficient strength. Otherwise they remain side by side in complete solution. In preparing the saline solution, it is preferable to use the pure crystalline sodic chloride employed in laboratories. This is quite a cheap substance. The advantage which this possesses over many of the ordinary varieties of common salt is that it forms a perfectly clear solution on being shaken with water, even though a large amount of undissolved salt be still present, the crystals quickly sinking to the bottom of the vessel in which the solution is being made. On the other hand, a solution of ordinary salt has often a muddy appearance, which only disappears after filtration or long standing. There is no other objection to the use of ordinary salt. The saturated solution can be prepared in quantity and kept at hand as an ordinary reagent, or it can be prepared each time as it is required. A small quantity can be made in less than two minutes, by placing some of the crystals in a test-tube, adding about an equal bulk of water, and shaking vigorously, slightly heating to 40° or 50° C., then cooling under the stream from a water-tap, still shaking, to about 15° C. (60° F.). The heat facilitates the solution without very appreciably increasing the amount of the dissolved salt as compared with that dissolved at the ordinary atmospheric temperature. It is a peculiarity of common salt that its solubility is very slightly raised by heating. It is essential to cool the solution before mixing it with the carbolic solution, for, if it be hot, the carbolic acid will not be precipitated but will remain in solution. It is needless to give directions for the preparation of the salt solution in bulk; it can be done in the usual way. It is only necessary to keep the bottle containing it in a place where its temperature is not likely in winter to be reduced to very near the freezing-point; otherwise the strength of the solution may be weakened by the deposition of the salt.

In performing the test, it is advisable to add the carbolic solution to the salt solution,—say in the test-tube,—not the salt solution to the carbolic solution. If the addition be made slowly, drop by drop, it will be observed that each drop produces a small white cloud of separated carbolic acid, which disappears at once with a single shake of the test-tube until the carbolic solution added is equal to about one-fourth part of the salt solution, when the separated acid no longer disappears on shaking. With every further addition of the carbolic solution the amount of separated acid increases, the fluid meanwhile becoming more and more opaque. The density is greatest when from three-fourths to four-fifths parts of the carbolic solution have been added to one part of the salt solution. With further addition of the solution the acid begins to be redissolved and the milkiness to disappear, and the mixture becomes almost perfectly transparent when about two parts of the solution have been added. If either too little or too much carbolic solution be added to the salt solution, no permanent precipitate of the acid will be obtained. Further, if the temperature of the mixture is above 23° or 24° C. (74° F.), the carbolic acid remains in solution, the solubility of the acid rapidly increasing with the rise of temperature. Should it happen, as it rarely does in this climate, that the temperature of the room is above 24° C., the mixture can be readily cooled by tap-water, or by the evaporation of a few drops of ether or alcohol on the outside of the test-tube in which the mixture is placed. It is necessary, in performing the test, to use test-tubes or glasses which have been previously well dried. A residue of water in the test-tube may prevent the reaction, as will be made evident immediately. It may be well to remark that, on adding a two and one-half per cent. solution of carbolic acid, a slight haziness is sometimes perceptible as a drop falls into the salt solution, but this instantly disappears.

The question now naturally arises, How far can a five per cent. (1 in 20) solution of carbolic acid be diluted before it ceases to give the reaction? It is interesting to find that the addition of quite a small quantity of water is enough to prevent the reaction,—that is, no separation of carbolic acid is obtained which does not disappear on slight shaking. For it always happens that when the stronger solutions of carbolic acid are employed, they give as each drop falls into the saline solution a distinct cloud, but this is at once dissolved on being diffused by shaking through the mass of the mixture. If the strength of the solution be lowered to 4.6 per cent. (1 in 21.7), the reaction is not obtained unless the tem-

perature of the mixture is below 8° or 9° C. (47° F.); if lowered to 4.5 per cent., the reaction fails unless the temperature is below 4° or 5° C. (40° F.). A 4.8 per cent. solution gives the reaction quite distinctly, though less so than a five per cent. solution, unless the temperature is beyond 18° C. (64° F.). Hence only a solution of greater strength than about 4.8 per cent. (1 in 20.8) can be trusted to give the reaction at the ordinary average temperature of the atmosphere in this country. A solution weaker than 4.5 per cent. (1 in 22.2) will not give the reaction, though the temperature approach zero. It happens frequently that, for convenience, chemists prepare the carbolic solutions from liquid carbolic acid,—that is, acid containing usually about ten per cent. of water; and at least one of the best known makers of the acid states on the label affixed to the bottle that, in dispensing the acid, the water may be disregarded. If chemists follow this instruction, and a five per cent. solution be prepared by *weight*, it will contain only 4.5 per cent. of pure acid, and will therefore not give the above reaction. If it be prepared by *volume*, as is likely in many cases, then, as the specific gravity of the liquid carbolic acid is greater than that of water, being about 1068 (one specimen of Calvert's was found to be 1070), a solution of greater strength is obtained, containing about 4.82 per cent. of acid, and therefore of sufficient concentration to give the reaction. It is thus quite easy to distinguish by means of the reaction carbolic solutions made from liquid and from crystalline carbolic acid, if both have been made by weight.

If it is desired to render the sodic chloride solution more sensitive, it can be readily done by saturating it with carbolic acid. Dr. Hay finds that a saturated solution of the chloride at 15° C. is still capable of dissolving carbolic acid to the extent of about 0.95 per cent., or, roughly, one per cent. Such a solution is best prepared by dissolving the salt to saturation in a one per cent. solution of carbolic acid. When the solution has become fully saturated, it will have a hazy appearance, from the separation of a little carbolic acid; this can be readily removed by filtration. If this solution be used instead of the simple salt solution, then it will be found to precipitate the carbolic acid more freely than the other, and, in the case of solutions stronger than 4.5 per cent., at any temperature under 32° to 35° C. (93° F.); but this increase in the sensitiveness of the reagent is gained at the expense of diminishing its value for the purpose of distinguishing carbolic solutions slightly weaker than five per cent. from those which are stronger. The reagent is now capable of precipitating carbolic acid in any solution stronger than three and one-half per cent. In solutions weaker than three per cent.—therefore in a two and one-half per cent. (1 in 40) solution—no precipitate is formed, or, if it is, it at once disappears on shaking. If the surgeon wishes merely to possess a reagent which will readily, and at any ordinary atmospheric temperature, enable him to distinguish a five per cent. from a two and one-half per cent. solution of carbolic acid, the carbolized salt solution is decidedly preferable to the simple salt solution.

There is still another way in which chloride of sodium may be employed,—viz., for the distinguishing of very strong and very weak solutions of carbolic acid,—not the usual surgical solutions. It depends on the fact, which Dr. Hay has ascertained, that while a perfectly saturated solution of the salt is still capable of dissolving about one per cent. of carbolic acid without separation or displacement of the salt, yet a perfectly saturated solution of carbolic acid cannot dissolve more than the fragment of a crystal of the salt without the acid beginning to separate. Hence, if, on dissolving a small crystal or two of common salt in a solution of carbolic acid, the fluid becomes opalescent, and the opalescence does not appear on shaking, the solution is a saturated one,—that is, it contains about seven and one-half per cent. of acid. If, on the other hand, no opalescence appears, not even when so much salt has been dissolved in the carbolic solution, by shaking and slight heating and subsequent cooling, as that the solution has become saturated with the salt, then the original solution contains less than one per cent. of acid.

It is perhaps desirable, in conclusion, to briefly summarize the contents of this communication. The three reagents suggested are: 1. A saturated solution of chloride of sodium. This precipitates carbolic acid from solutions stronger than 4.8 to five per cent., at a temperature not exceeding 18° to 24° C. (64° to 75° F.). It causes no permanent precipitate in weaker solutions. 2. A carbolized saturated solution of carbolic acid. This precipitates carbolic acid from solutions stronger than three and one-half per cent., and it does so, in the case of solutions above four and one-half per cent., at any temperature below 32° to 35° C. (90° to 95° F.). It gives no permanent precipitate with weaker solutions.

This is the best reagent for the simple distinction of the usual surgical solutions,—two and one-half and five per cent. 3. Solid chloride of sodium. A small crystal of this precipitates carbolic acid from a saturated solution; whereas, when dissolved even to saturation in a weaker carbolic solution than one per cent., it gives no precipitate.

CONSTITUENTS OF LOBELIA.

Lobelia nicotianæfolia is indigenous to Southern and Western India; the infusion of the leaves is used as an antispasmodic. The lower part of the stem is woody, about one and a half inches in diameter; the upper part is hollow and tubular. The leaves resemble tobacco-leaves in shape, are finely toothed and hairy. The capsules are of the size of a pea, two-celled, and contain numerous light brown seeds which are about one-fiftieth of an inch long, oval, flattened, and finely striate. The dried plant is covered with numerous resinous dots, and has an acrid, biting taste. Dr. H. v. Rosen (*Amer. Journ. of Pharm.*, August, 1886) obtained from the powdered herb—

Moisture	12.77
Ash (of which 2.04 per cent. was soluble in water)	9.35
Sand	0.47
Albuminoids and alkaloids soluble in water	2.49
Albuminoids soluble in soda solution	8.23
Insoluble albuminoids	9.09
Cellulose	28.58
Fat and other substances soluble in petroleum benzin	3.68
Resin and chlorophyll soluble in ether	2.01
Mucilage soluble in water	2.50
Metarabic acid (pectin)	0.27
Lobelic (?) and other vegetable acids	6.21
Amylaceous substances	1.29
Other substances soluble in water	1.60
Other insoluble bodies (cuticular substances, lignin, etc.)	11.46
	100.00

The presence of alkaloids was ascertained from the acid infusion which was successively agitated with petroleum benzin, benzol, and chloroform, then rendered alkaline with ammonia and agitated as before. The benzin solution from the alkaline liquid contained the liquid alkaloid *lobeline*, and the chloroform solution when evaporated left striated prisms of another alkaloid; minute quantities of the latter were also found in the benzol solutions from both the alkaline and acid liquid, and a somewhat larger quantity in the chloroform solution from the acid liquid. The benzin solution of lobeline gives with ether and hydrochloric acid a whitish precipitate of *lobeline hydrochlorate*, and this salt yields with Frœhde's reagent the characteristic red color passing into violet, and gives precipitates with picric acid, auric chloride, and with bromine in potassium bromide. The second alkaloid yields heavy precipitates with the usual reagents, except picric acid and tannin, which cause in the solutions a slight turbidity; Frœhde's reagent gives a brown color changing to green, and sulphovanadic acid causes a cherry-red or violet-red coloration.

The same two alkaloids were also obtained from Lobelia inflata, *Lin.*, though the volatile lobeline was present only in minute quantity, the herb having been on hand for a prolonged time.

The physiological experiments were made with lobeline sulphate prepared by Merck, and with the two alkaloids obtained from the above species obtained by Dr. Ott, though the author's explanation differed somewhat from Dr. Ott's.

LOSS OF WEIGHT IN EPILEPSY.

Dr. F. Hallager, assistant physician to the lunatic asylum at Viborg, has endeavored to find an explanation of the diminution of the weight of the body after an epileptic attack. Kowalewsky was the first to draw attention to this fact. He states "that all persons suffering from any form of epilepsy lose in weight after each attack." "This occurrence is not equally great in every case, but depends on the duration of the disease and the intensity of the attack. The loss of weight is greatest after the first attack of a series of epileptic fits." Dr. Hallager has drawn up a table indicating the weight of the body and the quantity of urine and fæces excreted by the patients each day during his researches. Solid or liquid nourishment was given to the patients in proportion to the frequency and violence of the attacks. By a chart accompanying the paper in the *Nordisk. Med. Arkiv* it appears that whenever the curve of weight is considerably depressed after an attack there is also a corresponding elevation in the urine curve, of which no explanation is afforded by any increase of diet. When a loss of several pounds takes place, it is owing to the secretion of an abnormal quantity of urine. Dr. Hallager has been unable to determine whether the production of urea is also increased by the attack, but he believes the increased formation of urea is not sufficiently great to be of importance in the loss of weight. The dimi-

nution of weight caused by an epileptic attack he considers to be due to an increased secretion of urine after the fit. M. Kowalewsky insisted that psychic epilepsy, as well as the *grand* and *petit mal*, is followed by a diminution of weight. This is contrary to Dr. Hallager's opinion, who believes that there is no diminution during this psychic state except when the patient refuses all nourishment, and that the quantity of urine secreted is much less than normal. This is no doubt due to a reaction after the preceding augmentation. The fact that psychic troubles of an epileptic origin (especially when of long duration) may, like other maladies, cause a loss of weight, is natural; but this loss, which arises from general emaciation, has nothing in common with the diminution of weight after an epileptic attack, which results from a diminution of the quantity of water in the body, due to preceding augmentation of urine.—*Lancet*, August 21, 1886.

UNTOWARD EFFECTS OF PARALDEHYDE.

In 1884, acting on the suggestion of Dr. Keraval, Dr. Jas. G. Kiernan tried paraldehyde as a means of securing slumber in excited cases. It was generally stated that paraldehyde had all the good qualities of chloral hydrate, without its bad effects. At first sight such a statement was improbable, because the evil and good effects of chloral hydrate arise from its physiological action, and any remedy having the good effects of chloral hydrate must have the bad effects in a minor degree.

He found, after very careful experimentation, that paraldehyde produced irritation of nearly every mucous membrane in the body as a secondary consequence of its soporific effect; that it markedly impaired digestion; that scarlatina form skin eruptions, attended by itching and scaling off of the skin, frequently followed its use. Irritation of the eyes was as frequent as after the use of chloral hydrate. The same intractable nail ulcers followed its brief use, as so frequently follow the long-continued use of chloral hydrate. Paraldehyde, in his hands, has shown all of the untoward results of chloral hydrate, while the slumber produced by it has been neither so profound nor so refreshing as that produced by the latter. None of these results were due to methods of administration or impurities of the drug. In his opinion it hardly comes up to the requirements of a hypnotic.—*Western Druggist*, September, 1886.

BACTERIUM TERMO TREATMENT.

Dr. Roquer y Casadesus, of Barcelona, having a case of laryngeal and pulmonary phthisis of an advanced character, and wishing to test the value of Cantani's bacteriotherapeutics, asked Dr. Rodriguez Mendez, a well-known microbiologist, to assist him. The condition of the patient was carefully ascertained in consultation, cavities being found in both apices. There was a high temperature, also profuse sweats, diarrhœa, profuse expectoration, great dyspnœa; in fact, every sign of acute pulmonary tuberculous degeneration. The patient was in the seventh month of pregnancy. A pure culture of bacterium termo was then prepared by Dr. Botey, and made use of both by means of inhalations twice a day and by intra-laryngeal applications. After a few days the patient's condition was improved, the temperature having fallen from 39° to 38° or 38.4° C. This improvement continued till labor came on, which was of a normal character, but shortly after delivery the woman's condition became alarming, and she died in twenty hours. Dr. Roquer concludes from this case that, whether the remission of temperature was or was not due to the treatment, the bacterium termo was perfectly innocuous, as Professor Cantani states it to be. Dr. Philipovich, who has made several trials of the treatment of phthisis by the inhalation of cultures of bacterium termo, has published a paper describing the results obtained in the reports of the Odessa Medical Society. In one case the inhalations had to be stopped in consequence of the condition of the patient becoming worse, three cases died, and two were discharged. Dr. Philipovich's observations agree in general with those of Dr. Görbersdorf, and are decidedly inconsistent with those of Professor Cantani. The expectoration did not diminish, but it was rather more easily secreted, and so the dyspnœa was less. This, however, was probably due to the action of the water and the better aeration of the lungs rather than to the microbe. In one case the quantity of sputum was increased, and it became more liquid and very offensive. At the necropsy in this case cavities were found containing tolerably pure cultures of bacterium termo. In none of the cases did the tubercle-bacilli in the sputum disappear or even diminish, though the inhalations were continued for seven weeks. Again, no effect was produced on the temperature or sweats, and in all the patients there was noted a greater or less loss of weight. The author concludes that no beneficial effect can be

looked for from the use of this method of treatment; indeed, it would rather appear, from the post-mortem appearances above mentioned, that inhalations of bacterium termo may be positively hurtful to the human organism.—*Lancet*, August 21, 1886.

SACCHARIN.

The conclusions arrived at by Stutzer concerning the innocuousness of saccharin when taken into the human body have recently been confirmed by PROF. SALKOWSKI (*Virchow's Archiv*, cv. p. 46); and PROF. DRESCHFELD, of Owens College, Manchester, has ascertained that when given in diabetes it does not affect either the quantity or the sugar passed. It has scarcely any retarding effect on the digestion of either proteids or carbohydrates, and in two cases of acid dyspepsia it was found to relieve some of the troublesome symptoms. It has also been found that added in small quantities it increases the diastatic action of malt in the presence of sugar.—*Pharm. Journ. and Trans.*, August 28, 1886.

TESTS FOR THE PURITY OF MILK.

What process affords the simplest and most accurate tests for determining the quality of milk, was the subject of a paper read before the Massachusetts Pharmaceutical Association by W. W. BARTLETT (*Western Druggist*, September, 1886), who called attention to the various procedures used by adulterators of milk, and discussed various methods of discovering the same, giving preference to Wanklyn's method. Milk should have a specific gravity at 60° F. of 1029 to 1033; if fresh, should have a slight acid reaction; alkaline reaction in alleged fresh milk indicates adulterants; excessive acid reaction indicates lactic fermentation. The cream should be determined by a 100 c.c. tube, graduated into cubic centimetres, and the volume read off at the end of twenty-four hours. The total solids are then determined as follows: If a porcelain capsule be used to evaporate the milk, a small amount of pure white sand should be added to the latter, after having been washed, heated red, cooled, and then weighed with the capsule (the sand breaks the film formed on the drying milk). It is best, however, to use a perfectly flat-bottomed platina capsule, two and one-quarter inches in diameter and one-half inch deep. The capsule, being perfectly balanced on the scales, five grammes of milk are carefully weighed into it. The dish is then placed on a water-bath, heated till apparently dry (takes about one to one and one-half hours). It is then placed in a hot-air oven, and exposed to a heat of 220° F. for half an hour, by which time its weight will be constant. The difference between the weight of the empty capsule and its present weight will be the weight of the solid constituents of the milk. The capsule and contents are next placed upon a water-bath, and boiled with three successive portions of petroleum benzine, decanting off each portion carefully after boiling for a minute. The capsule is then carefully washed off with benzine, dried in the oven, cooled in a desiccator, and quickly weighed; as the fat is removed by this process, the difference between this last weight and the former is the weight of the fat. The other solids ignited at a red heat yield the percentage of inorganic salts. The amount of water present is easily determined. Thirteen per cent. of water found in each sample in excess of eighty-seven per cent. allowed by law, represents one per cent. of added water. The amount of milk-sugar may be determined by a standard Fehling's solution, or the polariscope; the last yields the best results.

TRIBROMIDE OF ALLYL.

Tribromide of allyl is another compound that has only had its possible use in medicine discovered after a period of years. It was first prepared by Wurtz in 1857 (*Ann. de Chimie*, li. 91) by the reaction of iodide of allyl on one and a half times its weight of bromine, and is a colorless liquid, soluble in ether, boiling at 217° C., and having a specific gravity of 2.436. According to DR. DE FLEURY (*Archives de Pharm.*, August, page 352), this compound has been employed with good effects in hysteria, asthma, angina pectoris, and infantile convulsions. It was administered in capsules, each containing 5 drops, two to four capsules being given daily, or subcutaneously in doses of 2 to 4 drops dissolved in one or two cubic centimetres of ether.—*Pharm. Journ. and Trans.*, August 28, 1886.

DR. SCHMITZ, of Bonn, reports in the *Centralbl. f. Kl. Med.* vii., 15, 1886, two cases in which the vapor of carbolic acid (employed in pneumonic catarrh and diphtheria) caused clonic-tonic convulsions.